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ABSTRACT

Described are existing components that could be linked together to form a Western Bibliographic Network or could provide products and services for Network members. The components reviewed are: (1) state library agencies, research libraries, state and multistate library networks, and other regional organizations in the 17-state western region and the province of British Columbia; (2) organizations acting as bibliographic utilities to offer centralized, on-line computer support for technical processing, reference, and interlibrary loan; (3) catalog, serials, citation, and inventory control types of bibliographic data bases; and (4) telecommunications services. A survey of union serials data bases in the West is appended. (Author/PF)

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A REVIEW OF POTENTIAL COMPONENTS FOR THE WESTERN BIBLIOGRAPHIC NETWORK

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Western Bibliographic Network Project
Western Interstate Commission for Higher Education
Boulder, Colorado 80302
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ABSTRACT

This report describes components that could be linked together to form the structure for the Western Network or provide products and services for Network members. The components reviewed are:

(1) state library agencies, research libraries, state and multistate library networks and other regional organizations in the 17-state western region and the province of British Columbia;

(2) organizations acting as bibliographic utilities to offer centralized, on-line computer support for technical processing, reference, and interlibrary loan;

(3) catalog, serials, citation, and inventory control types of bibliographic data bases; and

(4) telecommunications services.

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A REVIEW OF POTENTIAL COMPONENTS FOR THE WESTERN BIBLIOGRAPHIC NETWORK

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A REVIEW OF POTENTIAL COMPONENTS FOR THE WESTERN BIBLIOGRAPHIC NETWORK

I. INTRODUCTION

This review is a summary of information about many of the potential components for a Western Network. It is intended to provide a common base of knowledge about each component so that the Network Steering Committee, Technical Advisory Groups, State Network Design Teams and the Network Project staff for the Western Network can develop a strategy for linking these components together into a structure that provides equitable and cost-effective access to better library service for all western citizens.

We are starting from a basic premise that by using existing components the Western Network will capitalize on the rich resources of librarians, libraries, materials, systems, data bases and communications networks already in place, and can speed the further development and wider distribution of bibliographic products and services to libraries that can make good use of them right now. The design concept for the Network envisions that it will serve as a linking organization whereby the major library agencies, institutions and groups in the West can work cooperatively to secure to their constituencies the benefits that can be derived from carrying out certain activities in a centralized, coordinated fashion. These activities have to do with making best use of available bibliographic utilities while seeking to improve and extend their capabilities in the future in collaboration with other regional networks and the developing national library and information network.

WARNING

Some of the information contained herein is based on personal communications and may not be wholly accurate nor may it reflect the official positions of the organizations concerned. Opinions expressed are solely the responsibility of the author, as are all interpretations of written and verbal material used as sources in the review of potential components. Comments, corrections, and suggestions for improvement will be warmly welcomed.

Thus, the potential components for the Western Network with which this report deals are:

(1) state library agencies, research libraries, state or regional networks, and other major library organizations;

(2) bibliographic utilities, or organizations in either the public or private sector that provide bibliographic products and services to libraries;

(3) bibliographic data bases in machine-readable form that are accessible via a utility or that could be used by libraries other than the originator; and

(4) telecommunications facilities needed to link libraries and bibliographic utilities, and for interlibrary communication.

The list of potential components discussed here is far from complete. There are a number of other library associations, consortia, networks and groups in addition to those described in Section II that will have a role to play in a western multistate network. There are many fine bibliographic centers, computer-based systems and vendor-provided services in daily use throughout the region in addition to the utilities described in Section III. Data bases of every kind abound; Section IV describes only a few examples. Section V just begins to cover the set of telecommunications facilities available for tying libraries together and for providing access to the utilities.

An ongoing task for Western Network planners will be to identify other potential components and to gather more detailed data about them. A major contribution the State Network Design Teams can make is to match the set of components in their states with the set described in this document, correct any misstatements, add more detail to these component descriptions, provide descriptions for other components in their states, and suggest ways for linking their state components into a regional network.

The descriptions of organizational components and bibliographic utilities have been reviewed by the organizations concerned, and the thoroughness of the reviewers in making comments is greatly appreciated. A first draft of the document as a whole was distributed to the Council on Library Resources and the 21 members of the Western Network Organizing Steering Committee just prior to their first meeting on February 2-3, 1976.

II. ORGANIZATIONS AND AGENCIES

Potential components that would be linked in a Western Network are the organizations and agencies that represent various political jurisdictions, library constituencies, and major institutions in the library picture in the West: the state library agencies, state networks, academic research libraries, bibliographic centers and other networks within the 17 western states and British Columbia. Within a state there may be a number of multi-library organizations, called systems, networks or federations; since these are usually based upon public libraries, they might be considered as part of the constituency of the state library agencies or it might be desirable to accord them a distinct place in the Network's structure. We have not identified a potential network component that represents special libraries other than the state and regional intertype networks, although we are certainly interested in including them in any network plans and activities. Academic libraries, other than the major research libraries, are also not represented by a separate potential network component, although these, too, must be included in a Western Network. State and regional library and information science professional associations, although not included in this review, might also be affiliated in some way with the Network.

The organizations and agencies described in the following pages are considered as building blocks on which network membership might be based. Thus, we anticipate that, for example, local public libraries would participate in the network through their state library agency. In most cases, academic and special libraries might be represented by a state library agency (since in some states, this agency is designated by statute as being responsible for providing assistance to all libraries within the state). In other cases, such libraries might be network members directly, or participate through a multi-library group, or the network might be organized to provide a structural framework for representing their interests collectively. Once again, the basic design concept for the network that has guided the preparation of this review considers the Western Network as an organization that links together existing state and regional groups of libraries and major research libraries; there is no intent to develop a bureaucratic superstructure that under the guise of "efficiency" interferes with the librarian-client or library-supporting institution relationships.

Treatment of the various components is somewhat uneven. This is due solely to the amount of data available on which the review is based, and no inference about a component's importance should be drawn from the length at which it is treated in this document.

State Library Agencies

In general, state library agencies have responsibility within each state for assisting and advising all libraries (but usually with emphasis on public libraries), for operating library services for members of state government (and in some cases the general public as well), for administering federal and state library services and construction grants, and for carrying out long-range planning and coordination for statewide library service. Typically, the state library agencies have no direct relationship to academic and special libraries, although they maintain liaison with and may provide some assistance to such organizations. Some state agencies, however, have statutory responsibility for supporting and improving library service from all types of libraries in the state. Many of the state agencies support or operate a TWX or similar telecommunication network for interlibrary loan, often with the state agency providing location information and acting as a message-switching center.

Several of the western states employ regional public or intertype library service systems, operating more or less loosely under the jurisdiction of the state library agency. The regional systems generally offer an opportunity for libraries within the region to cooperate in areas such as reciprocal borrowing, interlibrary loan, acquisitions sharing, and continuing education for staff development. Each regional system usually has one or two major libraries that serve as a resource for the other libraries in the system; academic libraries frequently take on this regional resource role. Some of the regional systems operate as intertype networks in which all kinds of libraries in the region participate.

Table 1 presents descriptive data for the 17 western state library agencies adapted from Donald B. Simpson's The State Library Agencies: A Survey Project Report, 1975, with amendments offered by several state librarians. As can be seen, there is a great diversity among western state agencies in terms of staff size and the total budget under agency control.

TABLE 1. Size of Western State Library Agencies and Number of Regional Systems Within State, 1975.

STATE	STATE LIBRARY AGENCIES			REGIONAL SYSTEMS IN STATE
	Staffing		Budget	
	Professional	Total	1974-75	
Alaska	10	33	$ 945,720	- -
Arizona	21	74	2,321,[illegible]9	6
California	58.5	234.6	6,966,186	21
Colorado	21	24	3,937,520	7
Hawaii	109	408	5,457,314	- -
Idaho	8.6	25.5	988,300	6
Kansas	12	31.5	1,875,192	7
Montana	7	23.5	516,322	6
Nebraska	29	49	1,021,710	6
Nevada	9	30	985,927	3
New Mexico	14	75	1,033,081	- -
North Dakota	4	18	806,807	8
Oregon	21	71	1,330,800	- -
South Dakota	8	3[illegible]	711,858	- -
Utah	32	70	1,552,647	- -
Washington	43	117.2	4,243,614	14
Wyoming	8	31	597,091	- -

Hawaii is unique in that the State Department of Education is responsible for school and public library services in that state; however, the figures in the table include staffing and budget for public libraries only. The South Dakota State Library provides direct service to about 1/3 of the population in that state. Alaska also provides direct services to individuals, families and schools that do not have access to a public library. State agencies frequently serve as distributors and as depository libraries for state documents, and many operate a special collection dealing with state history.

The states of Arizona, California, Nebraska, New Mexico, North Dakota and South Dakota maintain union catalogs of the holdings of at least some major public libraries in each state; the catalogs may also include some academic and special libraries. Some of these states also produce union lists of serials. Union catalogs are mostly in card form, but the Oregon and Washington catalogs are maintained in machine-readable form; Nebraska is beginning to develop a holdings data base via OCLC. Union lists of serials are usually in machine-readable form. North Dakota's list covers 46 libraries and is produced jointly with Minnesota by that state's MINITEX system. Arizona and New Mexico are also developing numeric location registers for use in identifying what libraries hold a particular item. A numeric register is an index containing an identifier, such as the Library of Congress card number (LCCN) for a book, and the codes for libraries holding the book. (Holder codes have not been standardized; although some union catalogs and lists use National Union Catalog (NUC) alphabetic codes to identify holding libraries, others use locally-developed codes.)

Alaska, Nevada and Utah operate state processing centers for library materials. These centers act as purchasing agents for local libraries and, when materials are received from vendors, prepare the catalog cards and ready the materials for shelving in behalf of the client libraries. California and Colorado formerly operated such processing centers.

Alaska has an interlibrary loan (ILL) and interlibrary reference (ILR) network for all kinds of libraries that uses the State Communications' TWX service to reach regional centers that are themselves linked by Telex to each other and to the Pacific Northwest Bibliographic Center (PNBC). Alaska assisted in the development of the Washington Library Network's (WLN) computer system and data base; WLN maintains the catalog for the

Alaskana collection. A project to add retrospective holdings for Alaskan libraries to the WLN data base is under consideration.

Arizona operates the CHAIN (Channelled Arizona Information Network) TWX-based interlibrary communication service to support ILL; requests are channelled through regional resource libraries. California has both ILL and ILR TWX and telephone networks; these are centered on the San Francisco and Los Angeles Public Libraries as well as on the State Library. Colorado has a TWX network for ILL that is operated by the Bibliographical Center for Research (BCR), described in Section III; one of that state's regional systems uses telefacsimile for interlibrary communication. Hawaii has a Datatel network connecting the main public library on each island and the University of Hawaii. Idaho operates the LITTY Dataphone network interconnecting the regional resource libraries.

Public libraries in Kansas have access to a statewide TWX-based system for ILL named the Kansas Information Circuit (KIC). Local public libraries submit ILL requests to regional centers; unfilled requests are then forwarded by the centers to the KIC headquarters at the State Library. In addition, five urban public libraries and two university libraries submit their requests directly to the State Library, which acts as a switching center to transmit ILL requests to 12 of the 14 KIC libraries for searching and filling. The regional systems also have intrasystem networks in operation in an effort to fill more requests within the systems.

The Nebraska Library Commission operates as the state bibliographical center for a TWX network for 16 regional and 4 resource center libraries. North Dakota operates a private line teletype network connecting public and academic libraries, with a TWX terminal at the State Library for access to the public TWX network. The lines are leased through the state's allocation of excess federal circuits, and the annual per-terminal cost for equipment and line charges is $750. Nevada is developing a state network using regional resource centers backed up by the State Library. Of the remaining states, all have TWX or telephone nets incorporating at least the major public libraries and in many cases other types of libraries as well.

Currently, the states of Washington and South Dakota appear to have the most fully-formed state library networks in the West. The Washington Library Network (WLN) is an intertype library network. ILL service is organized by WLN, with the Pacific Northwest Bibliographic Center (PNBC),

described later in this section, providing back-up service. A batch-processing computer system, now being upgraded as an on-line computer-based bibliographic utility, maintains a union catalog for the network, produces printed and microfiche bookform catalogs, catalog cards and book processing materials for participating libraries. The SCAN (State Controlled Area Network) TWX service interconnects 35 libraries in the state. Washington is currently investigating the value of establishing a cooperative storage and lending center.

Networking in South Dakota is based on the philosophy that citizens should be able to obtain information as rapidly as possible. By law, the State Library operates as the center of a statewide network that incorporates "independent but mutually dependent"* public, school, academic and special libraries. South Dakota network components include: 1) In-WATS service to the State Library for use by any librarian or citizen; 2) use of the State Library collection as back-up for other libraries; 3) a card-based union catalog of five public, 14 academic and six special libraries; 4) a union list of serials produced by the State University; 5) State Library grants to 12 major libraries to support TWX service; 6) state-funded membership in the Bibliographical Center for Research (BCR) for obtaining location information; 7) wholly state-funded use of BCR's METRO service for on-line access to citation and other data bases (SDC, Lockheed DIALOG and New York Times Data Bank); 8) access to MEDLINE with user fees paid by the State Library; and 9) access to the State Network is provided to the Colleges of Mid-America (CMA), a consortium of northwestern Iowa and South Dakota private colleges. The South Dakota State Librarian contends that: ". . . our internal network is the most complete in its utilization and involvement of all libraries. . . ."*

The California State Library is experimenting with several automated systems to support networking activity in that state. It is currently supporting the Public Library Automation Network (PLAN) project in which seven public libraries are using BALLOTS (described in Section III) for reference, cataloging information, and preparation of machine-readable records for updating their catalogs, most of which are published in microfiche or bookform.

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* Letter from Herschel V. Anderson, State Librarian, dated February 12, 1976.

The California State Library also acts as one of the three major bibliographic centers in the western region by maintaining a massive union card catalog (CSLUC) with 8-1/4 million location records for 2-1/4 million titles representing the holdings of 82 California libraries, and provides a location service to state libraries similar to that of BCR and PNBC, described later in this section. The staff handles 500 to 600 requests per day, and responds with up to five locations per citation. Unlike PNBC, the CSLUC does not operate as a switching center; location information is returned to the requesting library, which is then responsible for requesting the loan of the material from whatever source library it wishes. CSLUC had a staff of eleven and a budget of about $172,000 at the end of the 1974 fiscal year.

From the foregoing, it can be deduced that a ferment of networking activity is already taking place in each state in the West. The Western Network could help in making the work done and expertise developed in one state available for the benefit of others. The states are both producers and consumers of bibliographic products and services; the Western Network could enhance the interchange of products and services among states equitably and freely without interference with the internal structures in each state.

Research Libraries

There are 19 academic institutions in the West, as evidenced by membership in the Association of Research Libraries (ARL), that support a major research library, which usually includes departmental branches and special collections. Whether publicly or privately supported, each of these institutions operates as a relatively autonomous organization.

The research libraries are critically important components of any major bibliographic network because of their vast holdings of books, journals, reports and other materials, most of which are of a highly specialized nature. Almost any person doing in-depth research on a particular subject needs access to the holdings of one or more research libraries. While research libraries have a primary responsibility to their institutions to provide the information materials needed by faculty and students for their scholarly research, these libraries also recognize an obligation to the general public to serve as an information resource. The research libraries loan and borrow materials from other libraries but, because of their

position as major information resources, are generally net lenders of materials. This fact is illustrated in Table 2. The data have been drawn from the Association of Research Libraries' Academic Library Statistics, 1974-1975, and show that most of the research libraries loan many more materials than they borrow. Loans have increased an average of 15% and borrowing of originals an average of 7% from the figures reported for the 1973-1974 year; borrowing of copies declined by 1%.

This imbalance between lending and borrowing places a serious economic burden on the research libraries. According to one study of academic interlibrary loans,* each lending transaction costs the lending library approximately $4.67 (in 1971 dollars). Thus, the research libraries have an understandable interest in equitable compensation for their continued or expanded role as information resource agencies. (The same situation exists for many of the large public libraries, although some receive at least partial funding support from state funds or grants from the state library agencies. Data on ILL activity of major public libraries, comparable to that reported for the research libraries, are not currently available; some will be collected during the Cost and Funding Studies survey being performed as a part of the Network Project.)

The research libraries are large organizations, as shown by their staffing and expenditure figures listed in Table 3, also drawn from Academic Library Statistics 1974-1975. Several of these libraries have some degree of the networking type of library automation, either developed internally or furnished by an outside supplier. (Undoubtedly, some of the blank spaces in the Networking Automation column are due to the author's lack of knowledge of these libraries rather than to a lack of networking activity there. We would appreciate hearing about networking activities in all of these libraries so the table could be complete and correct in subsequent editions of this document.) A few are OCLC users, with service in Arizona and New Mexico arranged by the Amigos Bibliographic Council headquartered in Richardson, Texas. (Amigos is an outgrowth of the Texas

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*Palmour, Vernon E.; Edward C. Bryant; Nancy W. Caldwell and Lucy M. Gray. A Study of the Characteristics, Costs and Magnitude of Interlibrary Loans in Academic Libraries. Prepared for the Association of Research Libraries by Westat Research, Inc., 1972, 127 p.

TABLE 2. Interlibrary Loan Activity of the Western Association of Research Libraries. Figures shown are for transactions involving the loan of original materials and photocopies of material. Net lending figures are shown as negative for libraries that loan more than they borrow. (Data for U. of So. California not available.) Year reported: 1974-75.

Institution	Loaned		Borrowed		Net	
	Orig.	Photo	Orig.	Photo	Orig.	Photo
U. Arizona	2,965	3,489	1,720	1,501	-1,245	-1,988
Arizona S.	1,634	1,772	2,474	1,986	+ 840	+ 214
Brigham Young	2,394	1,118	1,485	1,463	- 909	+ 345
British Columbia	10,571	11,718	3,306	3,557	-7,265	-8,161
UC Berkeley	13,650	11,866	4,125	2,429	-9,525	-9,437
UC Davis	2,450	6,761	2,962	2,395	- 55	-4,366
UC Los Angeles*	14,695	43,809	4,006	1,823	-12,872	-41,986
UC San Diego	2,907	6,772	2,070	1,915	- 837	-4,857
UC Santa Barbara	1,073	594	3,390	4,158	+2,317	+3,564
U. Colorado	9,069	9,880	4,540	3,951	-4,529	-5,929
Colorado State U	2,231	3,263	2,265	2,029	- 16	-1,234
U. Kansas	5,807	10,929	1,318	2,151	-4,489	-8,778
U. Nebraska	2,098	1,301	1,322	999	- 776	- 302
U. Oregon	5,047	1,288	1,401	993	-3,646	- 290
Stanford U.	16,737	32,000	3,529	N/A	-13,208	N/A
U. Utah	3,416	2,277	2,729	1,820	- 687	- 457
U. Washington**	11,457	61,393	2,383	1,193	-9,074	-60,200
Washington S.	1,348	1,014	1,013	983	- 335	- 31

* Includes activity of the Pacific Southwest Regional Medical Library which acts as a resource library for the National Library of Medicine (NLM) network.

** Includes activity both of the Pacific Northwest Regional Health Sciences Library, another NLM network resource, and of the Pacific Northwest Bibliographic Center which draws on the University of Washington collection.

TABLE 3. Staffing, Expenditures, and Networking Activity for Western Association of Research Libraries. Total staff figures include professional and non-professional permanent staff, as well as student assistant positions, all on an FTE basis. Expenditure for materials includes binding. 1974-75

Institution	Staffing		Expenditures ($)		Automation
	Prof.	Total	Materials	All Other	
U. Arizona	58	207	1,429,503	1,587,113	OCLC, Amigos
Arizona S.	38	208	1,042,172	1,625,900	OCLC, Amigos
Brigham Young	59	220	N/A	N/A	OCLC
British Columbia	97	487	1,629,797	4,838,685	
UC Berkeley	165	543	2,303,239	6,624,812	ULAP, BALLOTS
UC Davis	60	286	1,753,145	3,208,354	BALLOTS
UC Los Angeles	148	598	2,348,194	7,551,760	Biomed. on-line serials, BALLOTS
UC San Diego	50	210	1,237,481	2,530,994	BALLOTS
UC Santa Barbara	56	256	1,251,688	2,857,738	
U. Colorado	54	226	1,162,337	2,059,368	
Colorado State U.	36	115	697,310	1,164,305	
U. Kansas	61	220	1,102,360	2,039,387	
U. Nebraska	54	198	915,673	1,509,247	
U. Oregon	50	189	695,175	1,581,877	Blackwell
U. So. California	76	262	1,031,634	2,451,943	
Stanford U.	144	460	2,522,643	6,058,456	BALLOTS
U. Utah	43	190	832,665	1,643,499	OCLC
U. Washington	121	500	2,031,151	4,688,261	WLN
Washington St.	43	113	936,234	1,655,590	WLN

Interuniversity Council experiment in using OCLC.)

The University of California supports a University-wide Library Automation Program (ULAP), headquartered at Berkeley, in addition to local automation projects at the nine individual campuses. One of these projects is an on-line serials control system used by the Biomedical Library at UCLA which, if transferred to a campus computing network computer, might be available for general use. The University of Oregon contracts with Blackwell of North America for cataloging service; this vendor has a data base and cataloging products that might be particularly useful for western libraries. Stanford University has developed the BALLOTS system for on-line acquisitions and cataloging support. The Washington libraries are participating in WLN which now has a pilot on-line version of a similar computer system; the acquisitions module is based on experience with the LOLA system developed several years ago at Washington State University. Many of these libraries also make use of on-line search services offered by vendors such as Lockheed, the New York Times and System Development Corporation.

The University of California (UC) has nine campuses and just by itself represents a very large library network; in this respect it is somewhat similar to the State University of New York which has played a major role in networking in that state. The UC network has two regions, the northern centered on the Berkeley campus and the southern on the Los Angeles campus. Each region has an active interlibrary loan program with the various campuses in the area, but ILL between the two regions is less active because of the distance involved. Although none of its libraries have attained ARL status, the 19-campus California State University and Colleges (CSUC) system is another major library network; there, network automation is being developed in a centralized program in the Chancellor's office.

Research and academic libraries are the backbone of the other multi-state library networks that have recently appeared: NELINET, SOLINET, Amigos, and MIDLNET. The Western Network should provide the opportunity for such libraries to play the same role for this region.

Regional Medical Libraries (RML)

Two regional medical libraries on the West Coast have expressed much interest in the Western Network. As these are representatives of a national network in being, the hierarchically-structured National Library of Medicine (NLM) network, we should take advantage of their experience and capabilities, and in turn determine how the Western Network services and

products might fill some of the RMLs' needs. The Pacific Southwest Regional Medical Library Service (PSRMLS), headquartered at the Biomedical Library, UCLA, and directed by Louise Darling, acts as a regional resource center and service coordinator for medical libraries in Region XI, consisting of the states of California, Hawaii, Arizona and Nevada. The Pacific Northwest Regional Health Sciences Library (PNRHSL), headquartered at the University of Washington, and directed by Gerald Oppenheimer, serves medical libraries in Region X, consisting of the states of Washington, Oregon, Idaho, Montana and Alaska. At least two other RMLs serve western states: TALON, headquartered at the University of Texas Southwest Medical School, covers the south central states of Region IX, including New Mexico; and the Mid-Continent RML, headquartered at the University of Nebraska, serves surrounding states in Region VIII.

Regional medical libraries operate under a contractual arrangement with the National Library of Medicine (NLM). The performance contracts with NLM are renegotiated each year, with reimbursement for document delivery being subject to adjustment. In addition to operating as a resource center supplying photocopies of journal articles to requesting libraries in the region, as well as original materials and location information, they are also responsible for regional reference support, leadership in improving resources and services, technician-level staff training and evaluating the effectiveness of the libraries' use of MEDLINE and other NLM services. If an RML cannot fill a request, the library refers it to NLM. NLM refers appropriate requests it cannot fill to the British Library Lending Division. Local hospital and other medical libraries are encouraged to form consortia for interlibrary loan of materials and sharing of other services among themselves. Limitations are placed on the amount of material that can be requested free from an RML; the quota on free service is used as only one way to preserve the character of the RML as a back-up resource. PSRMLS filled 51,829 ILL requests and referred 6,412 to other libraries (3,699 to NLM) in the year ending June 30, 1975. PNRHSL handled 46,065 requests in that year. PNRHSL occasionally uses the PNBC catalog, but loan requests are referred to NLM.

Bibliographical Center for Research, Rocky Mountain Region, Inc. (BCR)

BCR is a revitalized version of the former Rocky Mountain Bibliographic Center. Under Donald B. Simpson's spirited direction during the past year, the Center has expanded its role from maintaining a location file for holdings of libraries in the Rocky Mountain states to brokering computer-based services to libraries in the states of Colorado, Iowa, Kansas, Nebraska, North Dakota, Oklahoma, Texas, South Dakota, Utah and Wyoming, and thus has become a multistate network within the Western Network's region.

Simpson and the President of the BCR Board of Trustees, Russell L. Davis of the Utah State Library Commission, participated in the initial planning for the Western Network and were members of the group that met in Boise in August, 1975 to reaffirm the need for the current Western Network Project. They have expressed their intention to cooperate in the development of the Network. As yet, however, the form in which this cooperation might be expressed has not been identified.

The Center is a non-profit corporation incorporated under the laws of Colorado. Under the bylaws, membership in the Center consists of all libraries, organizations, institutions and individuals who are designated in state umbrella contracts with the Center or who contract directly with the Center for services. Each member has one vote in electing members-at-large to the Board of Trustees. The Board consists of up to 20 voting members with a ratio of 1-1/2 chief officers of state library agencies contracting with the Center to each member-at-large. At least four meetings of the Board must be held each year. The Executive Director of the Center serves also as Secretary-Treasurer of the Board. The Board has responsibility for management of the business, property and affairs of the Center, including the negotiation and execution of all contracts with members and non-members.

The Center has four major service programs currently:

(1) INTERLOAN. Currently, the Center maintains a regional union card catalog containing 17 million locations for 6-1/2 million titles representing holdings of 127 libraries in a ten-state area, and performs ILL verifying, searching, locating and negotiating services. In FY 1975, some 21,073 transactions were handled and 621,289 locations were added to the union catalog. To enhance the service a highly specialized collection of bibliographic tools is maintained. BCR operates a statewide TWX library communications network in Colorado, and connects to communications nets in other states of the region.

(2) METRO. In July 1975, BCR established the METRO Information Retrieval Network for on-line searching of citation data bases offered by SDC and Lockheed. BCR negotiates blanket contracts with the vendors and provides necessary administration and training for libraries using the data bases. Member libraries can have terminals installed (as a number have) or can submit requests to a library with a terminal or to the Center. BCR now offers the New York Times Information Bank and is negotiating with several other data base suppliers for METRO access.

(3) BIBLIO. The library technical services program of BCR, begun in January 1976, provides libraries with access to bibliographic utilities or computerized library services offered through an on-line network. BIBLIO begins with participation in the Ohio College Library Center (OCLC) data system. The program features on-line cataloging, serials control, and a 2 million title data base that works toward the implementation of automated technical services.

(4) MISCELLANEOUS PROGRAMS. In addition to the direct and indirect services cited above, BCR is actively engaged in two other areas of prime interest and importance to libraries in the region: continuing education programs that emphasize "how-to-do-it" with BCR services; and research and demonstration projects involving BCR members in cooperative grants to experiment in devising better ways to provide library services. The Center plans to improve and expand telecommunications capabilities for member libraries by using leased telephone lines, where appropriate, and installing one or more minicomputer-based data concentrators and message switchers.

BCR is funded essentially on a fee-for-service basis. Five state libraries -- Colorado, Kansas, South Dakota, Utah and Wyoming -- contract with BCR for an umbrella membership for designated libraries within the state. Individual libraries and library systems, not provided for under a state umbrella plan, can contract with the Center for service. Non-member libraries can use the INTERLOAN program on a fee-per-request basis. In general, BCR adds a variable administrative charge to direct costs for Center services to fund Center staff and operations. As of June 30, 1975, BCR had a staff of 12 and had expenditures for the preceding year of $136,753; and as of January 31, 1976, BCR's staff has increased to 14 with a current FY 1977 budget of $389,042.

Pacific Northwest Bibliographic Center, Inc. (PNBC)

PNBC, directed by Lura Currier, services the states of Washington, Idaho, Alaska and Montana, as well as individual institutional members in Oregon and the province of British Columbia. The Center provides original materials and photocopies of journal articles from serials held at the University of Washington, and acts as a message-switching center to forward ILL requests to libraries recorded in PNBC files as holding the requested materials. The Center is a non-profit corporation owned by the member states and institutions. Policy is set by a seven member Board of Directors; Earle Thompson, Dean of Library Service at the University of Montana, is Board Chairman. Lura Currier participated in initial planning for the Western Network and attended the August 1975 meeting in Boise that reaffirmed the purposes of the Network Project.

The Center maintains a file of holdings information for 47 libraries in the region, containing approximately 9,000,000 location records for more than 4,000,000 titles. It serviced 64,000 requests in the year ending June 30, 1975, a 1/3 increase over the preceding year. Total expenditures for the year were $215,600. Factors that may have influenced the increase in transactions are the sharply increased costs for materials, with many libraries relying more heavily on interlibrary loan for materials that they cannot afford to purchase, and the increased use of on-line search services, particularly by major special libraries such as those at Boeing and Weyerhauser.

Member states contract for services on an annual fee basis, and the contracts cover public, academic and some special libraries within each state. The largest borrowers average about 250 requests per month, except for the Boeing Company, which averages about 700 requests per month. Because of this heavy workload, an additional charge is assessed for that company's use of the Center.

A halftime staff person is employed by Montana at PNBC to service location requests from that state. Montana thus has opted for centralized interlibrary loan, where individual libraries make requests directly of PNBC without first checking for holdings within that state.

California Library Authority for Systems and Services (CLASS)

CLASS is a statewide intertype library network that is in the process of formation in the state of California. While it is intended to serve that state primarily, a provision of the joint exercise of powers agreement that is the basis for CLASS allows it to serve other states as well. This provision is aimed at, but not restricted to, cooperation with the state of Nevada. Nevada currently provides services to one California county, and it is likely that Nevada (whose major population centers are located just over the border from California) would welcome a share in the products and services that CLASS may offer. At this point, it appears that CLASS would operate like a state network of the kind operated by state library agencies in Washington, Illinois or Indiana. However, CLASS will be independent of the California State Library, and thus will be a separate component to be considered in the Western Network. As stated in the joint exercise of powers agreement, the purpose of the Authority is ". . . to develop and implement a system for library program development and resource sharing including: (1) to provide for the cooperative development and maintenance of common bibliographic and holdings data bases; (2) to provide for development and implementation of an interlibrary loan and delivery system; (3) to provide for development and operation of systems for cooperative use of cataloging data, cooperative acquisitions, and other forms of resource sharing; and (4) to provide for the development and implementation of library systems for information exchange."

CLASS is being established through the mechanism of a joint exercise of powers agreement providing for six signatory groups: (1) the State Library, (2) the University of California, (3) the California State University and Colleges, (4) California community colleges, (5) counties, and (6) cities. The joint exercise of powers approach was selected instead of the non-profit corporation because, in California, publicly funded institutions cannot be members of a private corporation, nor can public agencies commit funds in anticipation of future services from a corporation; they can pay only for services actually received. It is expected that most of the signatory groups will sign the agreement in April 1976, and the Authority will then be officially established.

CLASS will have a Board of Directors consisting of the State Librarian and one representative from each of the other signatory groups. A representative of the private academic sector and a representative of special libraries will be non-voting members of the Board. There will also be an Advisory Council of up to 21 members elected from a Congress of Members. The president of the Advisory Council will be an ex officio member of the Board. The Congress of Members will consist of one representative from each individual member institution participating in CLASS. Representation on the Advisory Council will be proportional among seven library groups based on average funds expended by each group over the preceding three years for library materials and binding: (1) UC, (2) CSUC, (3) community college members, (4) public library members, (5) the State Library, (6) private academic library members, and (7) special library members. Each group, however, will have at least one Advisory Council representative.

Any contribution of information to the Authority, in any form by any member, will become the commonly held property of all members. There are no provisions in the agreement respecting what products and services the Authority will provide, nor what bibliographic systems it may use. It is expected that CLASS will concentrate first on offering services in the area of ILL and will probably take over maintenance of the California State Library Union Catalog (CSLUC).

Other Multilibrary Groups

Groups of libraries that cooperate with each other on some formal basis are found in every state. The participating libraries are usually located within the same geographic area, although they may share common interests on a basis other than geographic proximity.

Some of these groups are public library systems or federations, and consist of all public libraries within one area of a state. These systems are normally based on a large urban public library that acts as a coordinator and resource center for loans and reference. Libraries of other types, such as special or academic, may be included in the group; such groups may be called "intertype" networks. The intertype networks may operate in conjunction with, or have some of the same member libraries as, one or more public library systems. "Consortia" is another term in use to describe cooperative groups. Consortia are usually groups of academic institutions with cooperative programs, and the libraries associated with each institution cooperate on a

formal basis, but usually without having a designated headquarters staff devoted to consortium management. To give a better idea of these multi-library groups, one example will be described here. Although the example is drawn from information collected in a site visit in California, the network described might just as well have been located in almost any other western state.

The Metropolitan Cooperative Library System (MCLS), headquartered at Pasadena Public Library, is a public library system with 24 members. The System cooperates closely and is a grant co-signer with eight community colleges that are members of their own system. MCLS itself is a member of the intertype Southern California Interlibrary Loan (SCILL) network and the Southern California Answering Network (SCAN) for interlibrary loan and interlibrary reference support in the whole southern California region. This is illustrative of a common situation, in which a particular library may be a member of several groups organized for various purposes. The SCILL network began operations in June 1975 and now has 85 members consisting of four public library systems, two community college library systems, several large and small academic libraries and many special libraries. It is headquartered at Los Angeles Public Library, and is intended to provide access to library resources in one geographic area for faster patron service. SCILL is also intended to reduce reliance on other interlibrary loan mechanisms because they currently do not work well and because of a desire to exhaust local resources before trying elsewhere.

MCLS employs a Library Technician II who examines each ILL request, checks for holdings in the System union card file, and if not found there determines whether to send it directly to a particular library (e.g., a request on the subject of geneology would be transmitted directly to the Sutro Library, a branch of the California State Library), or to send it on to SCILL or the California State Library Union Catalog. Diverse routings for ILL requests are being tried experimentally. A Reference Coordinator determines where ILR requests are sent; usually, they are sent to SCAN or the State Library.

Within the SCILL network, academic library charges for photocopies are absorbed by SCILL. MCLS members provide free photocopying to other members for up to twenty pages per request.

It is expected that the State Design Teams will assist the Steering Committee and Network staff by identifying the multilibrary groups within their states and advising how best to relate Network plans to serving the needs of such groups, as well as suggesting how these groups can contribute their special resources and capabilities to Network activities. This subject is clearly one in which local knowledge is all-important.

Neighboring Networks

The Western Network will work cooperatively with other regional networks that, together, are contributing to the formation of a national library and information network. To the east, MIDLNET has just been organized. MIDLNET appears to have many of the characteristics envisioned for the Western Network and the prospects are excellent for mutual assistance in developing plans and programs. The Executive Director for MIDLNET is T. John Metz, and headquarters are in Green Bay, Wisconsin. The geographic area looked upon as potentially appropriate for inclusion in the network ranges from Michigan and Indiana to the western plains states and south to Missouri and Kentucky. North and South Dakota, Nebraska, and Kansas are thus presented with a choice of networks in which to consider membership.

To the south, the Amigos Bibliographic Council provides access to OCLC for libraries in Texas, Oklahoma, Arkansas, New Mexico and Arizona. The Executive Director is James H. Kennedy; headquarters are in Richardson, Texas. Amigos is the de facto successor to the networking activity carried on in the Southwest formerly by SLICE and the Texas Interuniversity Council (IUC). Although Amigos does not appear to be as similar to the envisioned Western Network as MIDLNET, it is likely that there will be opportunities for cooperation with that network for mutual benefit. For example, Amigos has some experience of value to the Western Network in dealing with problems of providing telecommunications over long distances between libraries and the maintenance of equipment in libraries that are not close to urban centers.

III. BIBLIOGRAPHIC UTILITIES

A bibliographic utility is an organization that offers support -- usually computer-based -- for library technical processing, interlibrary loan, or reference on a relatively public basis. Utility customers usually have little say in how the affairs of the utility are conducted, and this is a major feature distinguishing utilities from networks. In most cases, using libraries must purchase service from the bibliographic utilities, regardless of the declared profit/nonprofit status of the utility.

There are several computer-based, centralized, on-line bibliographic service organizations potentially available for western library use, both in the private and the public sectors. They are: OCLC, BALLOTS, WLN's new on-line system and BIBNET for cataloging; BALLOTS and WLN for acquisitions; and SDC Search Service, Lockheed DIALOG and the New York Times data bank for on line search service. It is likely that communications costs for connecting to local utilities would be lower than for connecting to utilities located in the East; fortunately, all of the on-line utilities, with the exception of OCLC and the New York Times Data Bank, are located on the West Coast, right in the heart of the region covered by the Western Network. In addition to the on-line utilities, there are several vendors with established reputations for the capability to provide cataloging products such as microfiche catalogs or union lists and catalog cards: e.g., Blackwell North America (formerly Richard Abel), Science Press, Autographics and Inovar. Baker and Taylor's BATAB program provides off-line support for acquisitions.

The array of utilities potentially available obviates the need to consider building an additional utility to serve the Western Network. While the existing utilities are based in some respects on technology that is becoming dated, they are effective and can provide needed support over the next few years while library systems and networks evolve to incorporate efficiencies made possible through new mini- and micro-computers, storage devices, and telecommunications technologies. The Western Network, together with other regional and national networks, has a role to play in representing the needs of member libraries to the utilities as their systems and services evolve. The networks themselves may eventually develop utilities of their own. The networks clearly have a function in setting up the communication systems needed for economically interconnecting libraries and utilities, and in requiring adherence

to bibliographic and communications standards so that any library can access a range of diffferent utilities and data bases without using specialized equipment or procedures for each.

Washington Library Network's (WLN) On-Line System

The Washington Library Network is developing an on-line bibliographic utility under the aegis of the Washington State Library Commission. The Washington State Library is responsible for computer system development and operation, with technical design and programming under contract to Boeing Computer Services and Washington State University. Funding for development and initial operation of the system has been supplied by the state legislature through the State Library's budget.

Basic concepts of the WLN computer system include:

1) Enhancement of citizen access to library resources anywhere in the state;
2) Support for most operations, for all types of libraries;
3) Quality control of data base contents;
4) Authority file capability for names and subjects;
5) Potential interface with other state, regional and national networks; and
6) Ability to intake and output records containing all applicable MARC content designators.

The WLN on-line system builds on experience that Washington has gained over several years in operating a batch-processing system providing cataloging and processing support and production of union catalogs for ten libraries as well as the on-line system for acquisitions developed a number of years ago at Washington State University. Although the first priority is to provide automation support to Washington Libraries, WLN is also willing that the system be used to support libraries in other states as long as the requirements for Washington libraries are satisfactorily met.

A limited version of the on-line system, operating on an IBM 360/65 computer in Olympia, is now in service. The basic operational version of the system is scheduled to be in place in July 1976 on an IBM 360/65 computer in Pullman, Washington. The system utilizes the vendor-supplied ADABAS file management system and the Intercom teleprocessing management module that have been designated as standard packages for the state.

Subsystems are planned for support of acquisitions, cataloging, circulation and serials control; only the first two are being implemented in 1976. The Acquisitions Subsystem will have the following capabilities:

1) ordering;
2) receiving;
3) claims generation;
4) generation of cataloging products at time of order or at time of receipt, if data are available; and
5) fund accounting.

Order records can be generated from data in the cataloging base. An in-process file is maintained for on-line searching and update.

For cataloging, the Bibliographic Subsystem has the following capabilities:

1) on-line keyboarding, with system prompts and immediate validation;
2) selective display of record content; and
3) retrieval and display of authority records and the authority index.

Products of the system will include multiple order and claim forms, management and statistical reports, catalog cards, spine and book card labels, resource directories (union lists), and custom book or fiche catalogs. Some tailoring for catalog printed records may be specified by individual libraries. Access points for WLN on-line searching include: control number; LCCN; ISBN; ISSN; author; title; series; subject; subject segments; and key words in title, series title, and corporate name.

The WLN system's capabilities differ from those of BALLOTS (described in the next section) in two respects. The Acquisitions Subsystem of WLN includes an accounting function, whereas BALLOTS does not. The Bibliographic Subsystem of WLN incorporates an authority control function for names and subject headings. At present, BALLOTS does not have a similar function although the need for it is recognized for supporting network activity. The purpose of the authority control function is to keep major bibliographic access points as accurate and standardized as possible to reduce the incidence of "lost" records in the data base (i.e., records that cannot be retrieved because their access points contain improper values). The WLN system for authority control provides the capability for including cross reference and for allowing certain

entries to be used by specified libraries but not by others. This permits a limited degree of tailoring of authority control to the needs of different types of libraries.

The file structures proposed for both WLN and BALLOTS provide for maintaining a standard, authoritative, bibliographic record for all materials (although all the data for a record may not be in one physical location). Modifications to the standard record can be identified for each library holding the item, both to reflect local cataloging practices and to hold data pertinent to the physical item itself, such as copy number and location. Since the standard and localized forms of the bibliographic record are kept separate, the capability is provided to maintain a "clean" bibliographic data base for use by all libraries seeking the most authoritative version of the bibliographic description for an item, while reserving the option to use cataloging data input by another library using the system.

Although key parameters of system effectiveness will not be available until the WLN on-line system reaches full operational status later this year, system documentation indicates that the user interface is about as good as BALLOTS or OCLC, and so should prove to be a system that is easy to use and one that requires a minimum of staff training. Because the on-line system is operational only in a pilot version, this review does not include user comments on the system, as has been done for BALLOTS and OCLC. The reader should not infer that the WLN system is therefore not the equal of those systems.

BALLOTS

The BALLOTS system has been under development for eight years at Stanford University, Palo Alto, California, and has been operational in support of the Stanford University Libraries since 1972. In the past year, access to BALLOTS files has been made publicly available to individual libraries and to a pilot Library Automation Network (PLAN) of seven California libraries in a project sponsored by the State Library. Currently, BALLOTS' catalog data base is searched by libraries from as far away as Washington, D.C. via the TYMNET dial-up network. BALLOTS is managed by A. H. Epstein, an assistant director of the Stanford Center for Information Processing.

BALLOTS supports both on-line acquisitions and cataloging for the Stanford University Libraries and cataloging for the PLAN libraries. In acquisitions, BALLOTS provides for ordering virtually all types of material

and handles all aspects of ordering and receiving except fund accounting. The latter function at Stanford is handled by the University Accounting Department. BALLOTS has the following features for acquisitions:

1) handles faculty and library staff requests for materials and notifies requesters of items received;
2) handles standing orders, blanket orders and approval orders;
3) produces want lists;
4) allows for automatic claim periods of different durations with option for manual override on demand;
5) performs automatic cancellation and reissue of orders (same options as above);
6) maintains vendor files, allows for special processing for individual vendors;
7) handles complete, partial or delayed shipments;
8) generates source data for the cataloging subsystem;
9) provides immediate validation of acquisition data; e.g., shelving location, book fund;
10) provides users with options for brief or full record displays (true also for cataloging);
11) "prompts" or suggests appropriate commands (also applies to cataloging;
12) allows users to "chain" or combine commands (also applies to cataloging).

Order records can be generated from data in the cataloging base (either MARC or previously cataloged materials). An in-process file is maintained for on-line searching. Use of the acquisitions subsystem at Stanford has resulted in the complete elimination of paper files for orders. The acquisitions and cataloging staffs now occupy a contiguous work area due to savings in space and to increased efficiency in material flow between the two departments.

For cataloging, BALLOTS has the following features:

1) allows an unlimited number of characters per record (true also for acquisitions);
2) supports on-line keyboarding, with system prompts and immediate validation;
3) searches all five bibliographic system files with single entry of a search (also applies to acquisitions);

4) provides variable format displays for LC-card-style and tabular input formats;
5) produces work slips, catalog cards and spine labels, and provides user with options to generate extra cards or suppress cards or spine labels;
6) accommodates listing of multiple locations of the same title in various branch libraries;
7) allows the substitution of MARC records directly for any local record; and
8) maintains standing searches automatically for items within the scope of MARC, but for which MARC records have not yet been received (also available for acquisitions).

BALLOTS currently operates on an IBM 370/168. For Stanford use, Sanders Associates 804 programmable terminals are hardwired to a PDP 11/45 front end processor; this allows the transmission of a full screen's worth of data between the computer and the terminal at 480 characters per second. Non-Stanford users access BALLOTS via a direct interface between the computer and communication lines with a 30 character-per-second transmission rate, and can transmit or receive one line of a display at a time. Response time is under five seconds, generally. Display formats are well designed for the convenience of users, and 100 staff members are trained to use the terminals in the technical processing work area. Terminals are also available in the public service area for use by reference librarians. The system is available between the hours of 8:30 A.M. to midnight, Pacific Time.

BALLOTS presently provides three levels of service to off-campus users. Level 1 provides the capability for users to search the data base and to receive outputs. Level 2 provides the capability for users to set up standing search requests for a specified length of time; searches are then run automatically each time the data base is updated with new MARC records. Level 3 allows users to transfer a copy of a catalog record to a temporary file, modify the content of the record, and have it saved on tape. This latter capability is used by the PLAN libraries to build files for newly cataloged materials which are then sent to a vendor to produce bookform or microfiche catalogs of new acquisitions.

BALLOTS includes a catalog card printing program for Stanford library use, and is presently developing a capability for tailoring card formats and contents to the requirements of other users. This capability is based on the catalog card printing program (BIBCARD) developed by the University of California.

BALLOTS is currently being modified to provide the full range of system capabilities to other libraries in addition to Stanford. By Spring 1976, it will be modified to accommodate the complete MARC record (it supports about 95% of MARC record elements now). The files are being redesigned to accommodate a centralized bibliographic record with individual variations saved, and to indicate the holders of a particular record (in-process or catalog). These modifications are being made over the next year, and are scheduled for operational availability by the first quarter of 1977. BALLOTS has also developed specifications for a programmable terminal with a full MARC character set and has selected a manufacturer who will deliver the terminal in 1976.

BALLOTS searching capabilities are quite versatile. Access points include order number (which is also the record identification number), LCCN, personal author, title word, call number, corporate or conference entry word, and subject. Author names may be specified in any form or order of forename and surname. Search arguments (except LCCN and record identification numbers) may be truncated, and arguments may be combined in one search formulation.

In summary, when modifications to support network operation are completed early in 1977, BALLOTS will offer most of the capabilities (except for authority control) desirable for supporting technical processing in libraries likely to be members of a western network. The staff is both capable and cooperative. Stanford at present is willing that the system be transferred to another organization, and is not insistent upon retaining control of it.

The Stanford University library staff has been pleased with, and readily accepted, BALLOTS.* All staff members in Collection Development, Reference, Reserves and Technical Services were trained in BALLOTS use as required, and none failed to master the system. Productivity of the Order Division increased such that there was a staff savings of six positions.

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*Project BALLOTS and the Stanford University Libraries. "Stanford University's BALLOTS System." Journal of Library Automation, v.8, No. 1, March 1975, pp. 31-50.

Work assignments in the Order Department were broadened, giving individuals more responsibility and eliminating narrow subject areas of specialization. Only manuscripts, sheet maps, and non-Roman nontransliterated items are still processed manually in the Catalog Department; thus about 99% of the total cataloging workload is handled via BALLOTS. Elimination of manual catalog card production resulted in a staff savings of 5.5 FTE.

Sara Carter Swinney, Librarian of the Sutter County Public Library in California, has reported on the participation of her library in the PLAN experiment, using BALLOTS.* Sutter County Public is a small library in a rural area of northern California.

Sutter County accessed BALLOTS to obtain cataloging copy that the staff then uses to create catalog cards. The library experienced a 72% hit rate, but expects that the rate will be much higher when standing search requests are established; MARC records appear to become available by the time materials are actually received from a publisher or distributor. The staff also used BALLOTS to verify titles for interlibrary loan requests, and to produce a few special bibliographies. Other libraries in the system to which Sutter belongs are tied in to Sutter via a TWX network, and Sutter performed BALLOTS searches for them for ILL verification and for cataloging data.

Use of BALLOTS allowed one professional staff member to be shifted from Technical Processing to Public Services. A major benefit of BALLOTS use has been the availability of authoritative cataloging data. As a small library, the staff did not have the capability of performing expert cataloging in-house. The library has a staff of 14; 8 have been trained to use the BALLOTS system.

As yet, no serious consideration has been devoted to providing a computer-to-computer connection between BALLOTS and WLN. While it is possible to exchange data by means of shipping records on tape between the systems, a communications line could be installed to allow on-line transfer of data and messages between the two systems. This would provide a capability for reducing overall storage costs by allowing each system to maintain only the records needed by its own user set; the whole MARC file need not be on-line at both systems. A request not found in one system's file could automatically be searched in the other system's file (in a manner analogous to the current

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*Presentation at "Update 1975: Libraries and Automation," Second Annual State Librarian's Conference on Library Automation, Burlingame, California, October 2, 1975.

BALLOTS logic of searching several files in a specified order -- in process, MARC, and cataloged items). Such division of storage between the two systems should be almost transparent to the user. Similarly, users of either system could check holdings records in both systems with a single location request. The same techniques could be used to switch search requests to other systems as well, such as OCLC or the University of Chicago system that may be fully operational in the near future.

OCLC

The Ohio College Library Center (OCLC) has operated a cataloging utility since the beginning of the decade, and currently serves libraries in almost every region of the country. The system provides users with the capability of using an on-line terminal to create copy for catalog cards, either by modifying an existing record in the data base or by adding a new record. Catalog cards are printed in filing order and shipped to the requesting library on a daily basis.

OCLC, as a component for the Western Network, has not been examined in detail as yet; however, it obviously must be considered in any network design. Currently, OCLC has two advantages over the BALLOTS and WLN on-line systems: it has been providing cataloging products to many libraries for several years and it has a much larger data base (about three times as large) than the other two systems have, although many of the records have never been used by more than one library to request catalog cards. Even when BALLOTS and WLN become fully operational for purposes of network support, OCLC will continue to be valuable for western libraries because of the holdings information to which that system provides access. One disadvantage of OCLC is the lack of an acquisitions subsystem, but this capability is promised for some time in the near future. OCLC is being used now by several libraries in the West: the University of New Mexico, New Mexico State University, Eastern New Mexico University, the Claremont Colleges, Pomona Public, Sunnyvale Public, Tucson Public and Brigham Young University, in addition to the research libraries listed in Table 3.

Michael Cart of the Pomona Public Library, California, has reported on the use of OCLC at that library.* Pomona Public has 230,000 volumes plus audiovisual material. Last year, it added 11,400 new titles and 19,000 volumes.

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*Ibid.

The library is provided OCLC service via a multidrop line (i.e., the same phone line may connect 20 to 30 different terminals to the OCLC computer center). Pomona Public was experiencing a 70% hit rate with the first try, and a 95% hit rate within a week following the first try. Catalog cards themselves cost 3.4¢ per card. Start-up costs for installing the terminal and setting up a format profile for catalog cards was about $325. The first time use charge of $2.25, assessed when catalog cards were requested, covered all costs for terminal, telecommunications, and computer use. Training was provided by OCLC at $15 per hour, plus transportation; two days training was sufficient.

As of the end of September 1975, the OCLC file contained 1.7 million records, of which 35% were MARC and the remainder were contributed by OCLC users. The file was growing at a rate of about 3,000 records per day. Daily use averaged 15,000 books being cataloged and 125,000 cards being produced.

Ann Ying Ling of the Sunnyvale Public Library, California, also reported on using OCLC.* There, a 98% hit rate was experienced. Delivery of cards from Ohio via United Parcel Service took three to five days normally, with a maximum delay of 2-1/2 weeks since OCLC use began in December 1974. Sunnyvale accessed OCLC via TYMSHARE, and service cost about $1000 per month total; this would be reduced by about a third if Sunnyvale were connected to OCLC via a multidrop line. (This drastic a reduction in total cost illustrates the importance of the telcommunications portion of network operating expense.)

Westat, Inc. performed a study during the latter part of 1974 and early 1975 of OCLC use by 22 Texas and New Mexico libraries participating in the Texas IUC/OCLC network (now Amigos).** Except in small academic and public libraries, no evidence was found that OCLC use resulted in lower costs for cataloging. However, searching time was reduced about 10% for order searching, and one public library running parallel manual and OCLC processing operations demonstrated a 0.6 minute per volume difference in favor of OCLC. When used in interlibrary loan searching, OCLC gave a 42% find ratio as opposed to 66% for the NUC and 51% for the Texas Numeric Register, but OCLC verification was considered to be notably more accurate and current than the other sources. OCLC find ratios for cataloging ranged from 65 to 74% among the libraries studied; subject matter was not a factor affecting the find ratio, but

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*Ibid.

** IUC/OCLC Network Evaluation: Final Report. Westat, Inc., Rockville, Md. August 31, 1975, 216 p.

publication date was, with find ratios ranging from 51% for pre-1963 publications to 71% for post-1972 publications. Most librarians using OCLC were enthused with the system and its promise of future capabilities for serials control and as a more complete union catalog. An introduction to the report, prepared by the IUC/OCLC Evaluation Advisory Committee, makes the point that introduction of the system caused libraries to analyze all their technical processing operations and made librarians aware of the interrelations among all internal library activities and of the importance of defining and extending relations among libraries.

BIBNET

BIBNET is a commercial cataloging system developed and marketed by Information Dynamics Corporation (IDC). The system offers on-line access to, and powerful searching capabilities for, a cataloging data base developed from MARC records and customer-supplied cataloging. A stand-alone system option utilizes an in-library minicomputer, display terminal and printer and employs a concept quite different from that on which OCLC, WLN and similar systems are based. Instead of the user being on-line to a central computer to create catalog records, the BIBNET user goes on-line only to search a central cataloging data base. Once records have been identified, they are transmitted to the storage device used by the in-library minicomputer, and the telecommunications link with the central computer is terminated. The cataloging records thus obtained can be modified by the library as desired, then printed out, without any further interaction with the central computer. This concept takes full advantage of the standard BIBNET services for on-line searching capabilities offered by a bibliographic utility (in this case, System Development Corporation (SDC), which maintains the central catalog file using data supplied by IDC; the file is named LIBCON/E), including subject access to catalog records, while minimizing communication costs incurred for ongoing connection from the local library to the central computer.

Records submitted by IDC customers are entered in the data base and copies are distributed through IDC's MCRS microfiche supplement file. Contributed records in the on-line file are truncated and tagged with a status code indicating that non-LC records are non-authoritative; only MARC records received from LC are maintained in full form. BIBNET users do not input data from their terminals except to add their holder codes to records in the data base.

The New Mexico State Library is experimenting with the on-line version of the system as a means for maintaining a union catalog, and the California State University and Colleges (CSUC) have tried it out as an alternative to OCLC or BALLOTS for their use. One problem with BIBNET's availability has been a delay in making the full file available; generation was completed late in 1975.

On-Line Search Services

Search services provide the capability for libraries to use a computer terminal in the library to look for citations on a particular subject in very large, centralized, data bases. These search services not only supplant printed indices traditionally used by librarians, but also they make it possible to locate citations through a combination of access points. In printed indices, searching can be done by only one access point at a time. An added advantage to the search services is their ability to print out, either at the terminal or at the computer center, a special bibliography developed as a result of the search.

In addition to the National Library of Medicine which operates MEDLINE, SERLINE, CATLINE, and other on-line services through a number of medical libraries, there are two major commercial vendors of search services, SDC and Lockheed. Each of these corporations offers access to a number of specialized data bases such as ERIC, NTIS, Congressional Information Service, the aforementioned LIBCON/E, and many others. The New York Times Information Bank is also marketed commercially, and provides on-line access to abstracts of articles appearing in that newspaper and numerous other publications.

Although the commercial search service vendors market directly to individual libraries, in recent years they have entered into contracts with library networks or groups. BCR, for example, brokers SDC and Lockheed services for its member libraries. Such contracts usually allow member libraries to receive small amounts of free time for demonstration and training purposes. The broker supplements the limited training services performed by the vendor.

Some of the search services have a limited message-switching capability. This could be used to advantage by network libraries to make ILL requests to a central point (e.g., PNBC) at the time that citations are identified in searching, thereby saving a librarian's time in transcribing the citation, and ensuring that the citation is correct and complete.

The rapid increase in use of on-line search services recently has stimulated a growth in demand for photocopies of journal articles and technical reports, as noted at PNBC. This trend can be expected to continue for some time as more libraries make use of the search services and as more patrons become aware of this new capability to obtain specialized bibliographies.

CLSI LIBS 100

While not a centralized utility, the turnkey system marketed by Computer Library Services, Inc. (CLSI) must also be mentioned. This system, called LIBS 100, is a stand-alone, minicomputer-based, on-line system that provides circulation control and (in some installations) film booking and acquisitions processing. Over the near future, only the circulation control system is being marketed, with the acquisitions system having been withdrawn for redesign to make it more suitable for use by academic libraries. Eleven libraries in the West have installed LIBS 100, and in doing so have converted all or much of their shelf lists (Appendix A). The advantage to a network of having such systems available is that data pertinent to an individual library can be maintained by that library, rather than having to go through additional handling to be added to a centralized network file; such additional handling introduces a delay factor which may make some of the data out of date in the central file, and an error factor caused by failure to transmit changes to existing records. The in-library computer could be connected to a centralized utility for order searching and for obtaining cataloging data, rather like the way BIBNET operates. Such a "distributed" or "dispersed" data processing system would depend upon the utilization of telecommunications networks to provide the capability for one library to transmit or receive data from the central computer utility or to peek into another library's file when it needs to find out, for example, whether a particular book is available for loan from that library, or to see what books the first library has on order. Illinois is experimenting with interconnections between LIBS 100 systems in use in that state, although these systems do not communicate with a central computer utility.

Potential use of LIBS 100 to handle interlibrary loans within a local area can be seen from looking at data supplied by the Boise Public Library from an analysis of ILL requests during November 1975. Boise has a LIBS 100 system and is considering the possibility of installing terminals at eight other public libraries in the system for which Boise is the regional resource center. Boise received 379 ILL requests and was able to fill 210 (55%) by sending or reserving materials from its own collection. At least

one other library in the system had a copy of 160 of the requested titles (42%), and 40 additional titles (11%) were held by these libraries but not by Boise. Thus, more than half the ILL requests might have been filled by other libraries in the system rather than Boise. If speed of delivery were a factor in some of the ILL requests, having terminals available at all the libraries could have allowed the requesting library to determine what other library in the system held the book -- and had it available for immediate circulation.

Sue Baerg of the Huntington Beach Public Library, California, reported at the California Librarians' Automation Conference on use of the LIBS 100 system at that library.* The library had 200,000 volumes, of which 45% were in the circulation control system's data base, with the remainder being added. An average of 2,100 books per day were circulated. The LIBS 100 system controlled circulation of all media, including booking of films, for which the public library serves three school districts under contract as the distribution agent. Unexpectedly, experience showed that many members of the library staff who were not involved in the circulation control function were nonetheless vitally concerned with circulation data. 80% to 90% of the staff used the system on a daily basis. The interlibrary loan staff used the system to determine whether or not a requested item was available for loan. The reference staff used the system to verify holdings, suggest alternative books for items that were currently on loan, and to find out on what floor a book was before sending someone to look for it. The system allowed the library to perform double the former amount of circulation with no increase in staff, and the savings in salary for no-longer-needed overdue clerks by itself was almost enough to cost-justify the system.

The LIBS 100 system operates on a PDP-11/05 with CDC 33 megabyte discs and customized terminals. This configuration supports 15 terminals and up to 300 megabytes (300,000,000 characters) of storage. Plans are in progress to use a PDP-11/45 which will handle up to 50 terminals. The circulation control system uses four files: a title file for bibliographic description of items to be circulated, a locator file for identification of a specific physical item, a possessor file for identification of a possible holder of a specific item, and an event file that contains a record indicating what the next action for an item in circulation is expected to be -- sort of a suspense file.

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*Op. cit.

Blackwell North America, Inc. (B/NA)

Batch processing support for cataloging products, when operated efficiently, might be more cost-effective for some libraries than on-line access to a computer utility. B/NA, located in Beaverton, Oregon, is a growing vendor in the batch production market for catalog cards, labels, and bookform catalogs on microfiche. B/NA offers a full range of services, from catalog card sets and processing kits to full cataloging and preparation of books for shelving. Various options may be selected by a library by means of a "profile" to specify Dewey or LC classification, call number formats, overprinting of subject headings, etc.

B/NA publishes a Title Index on microfiche that can be searched by title to find the unique identification number assigned to the catalog record by B/NA. This Index reflects both the complete and up-to-date MARC file and original cataloging submitted by B/NA customers or performed by B/NA. While all customers can order catalog card sets and labels by specifying simply LC card number or ISBN, those customers with a Title Index can also order by the B/NA record access number. In either case, there is no need to include a complete citation when ordering. B/NA will hold an order for a specified period of time waiting for a MARC record to be received from LC.

B/NA also provides subject authority control for cataloging supplied by customers. The Eighth Edition of the Library of Congress List of Subject Headings is available, and customers may specify other headings used in their own collection. Cross references may be included.

B/NA will produce microform catalogs, which many libraries are using now in place of card catalogs, to fit any film or fiche reader. Customers select the number of copies and frequency of update for the microform catalogs. They may also obtain copies of their catalog records in machine-readable form, and can require B/NA to restrict the use of the data that they have supplied. Union catalogs can be compiled and produced for groups of libraries.

Potentially, a cataloging service such as the one offered by B/NA or other vendors, such as Inovar, Autographics or Science Press, might be especially valuable for the Western Network. Union catalogs reflecting the holdings of all libraries in part or all of a state could be developed at very low cost and as a byproduct of libraries ordering their own cataloging products. Holding records could be drawn off in machine-readable form for addition to on-line catalog data bases maintained by utilities such as WLN or BALLOTS. Through making use of the B/NA Title Index and/or union catalogs produced for

a state, smaller libraries unable to make cost-effective use of on-line access to a bibliographic utility would still be able to take advantage of most of the benefits such utilities provide in reducing cataloging costs and providing location information for interlibrary loan. While the bibliographic utilities may eventually offer the same range of services as commercial vendors now do, it may be to the interest of western libraries to begin building an integrated cataloging and location data base by using commercial services.

Document Delivery Centers

Document delivery is becoming more important as more people are able to find more citations with the help of on-line search services more easily than was possible with manual searching. Speed of delivery is sometimes of critical importance to the patron. Document delivery centers can help satisfy the demand for better document delivery.

Any library is a document delivery center in the sense that it is capable of filling some interlibrary loan requests. What distinguishes the document delivery centers from other libraries is their organization around the function of document delivery rather than the full range of traditional library services. In other words, document delivery centers are in business to respond quickly to requests from other libraries for copies or loans of materials.

PNBC and the RMLs act as document delivery centers; one of their basic functions is to supply requested materials quickly. There are other centers that the Western Network might be able to use to advantage to improve document delivery and reduce ILL costs. The Associated Colleges of the Midwest (ACM) has a Periodical Bank with holdings of about 2,000 titles and access to holdings of the Newberry and John Crerar libraries in Chicago. An associate membership fee of $250 per year is assessed and photocopies cost $1.00 for the first exposure and $.20 for each additional exposure (normally, there are two pages per exposure). Requests are filled the same day they are received, when possible.

The British Library Lending Division (BLLD) is another document delivery center used by a number of American libraries, often as a resource of last resort. NLM, for example, uses the BLLD for requests that it cannot fill from its own collection. The BLLD attempts to maintain a nearly complete collection of contemporary serials as well as extensive back files.

The San Mateo Educational Resource Center (SMERC) operates a document reproduction service that can fill requests for ERIC and other educational materials in either hard copy or microfiche. National Technical Information Service (NTIS) technical reports can be obtained from centers such as the Western Research Applications Center (WESRAC) at USC or New Mexico's Technology Application Center.

These document delivery centers and others yet to be identified and studied may represent a resource for libraries in the Western Network that can be used to good advantage to improve access to materials and reduce ILL costs. The capabilities of these centers should be examined in conjunction with analyzing how the Network might operate to enhance ILL effectiveness.

Use of the Bibliographic Utilities by the Western Network

Each of the computer-based on-line bibliographic utilities described in this section has one or more features that at present distinguishes it from the other utilities: the large data base with holdings of many libraries and extensive network support experience of OCLC, the authority control capability of the WLN system, the operationally-proven multi-access-point search capability and fast response of BALLOTS, or the stand-alone capability of BIBNET. It might be desirable for a library in the Western Network to have the capability to use any of these utilities, or at least the content of their data bases, rather than be restricted to just one. This is technically feasible, and the Western Network should support the interconnection of the utilities and their adherence to bibliographic and communications standards that would allow using libraries to take full advantage of the special features of each utility. "Off-line" utilities, such as vendors like B/NA who provide commercial cataloging services, can be "interconnected" to the on-line utilities by transferring the data collected on western library holdings to the data base of one or more of the on-line utilities.

The Western Network can take an active role in procuring and integrating the products and services offered by bibliographic utilities to provide the most effective and economic support for western libraries of all types. Acting as an agent for these libraries, the Network can obtain favorable rates from suppliers based on high volume and, as a large customer, can wield more influence on the suppliers' offerings than could individual libraries. The Network could also act in a fashion similar to an original equipment manufacturer (OEM) in purchasing component products or services and tailoring them into a package designed to meet special needs of groups of its own customer set, the Network members.

Surveying the field of bibliographic utilities, it appears that the range of capabilities available can satisfy library support needs over the next few years. The challenge now is to determine how these capabilities can best be integrated to improve library service in the West.

IV. BIBLIOGRAPHIC DATA BASES

Cataloging and Serials Data Bases

The West is blessed with an abundance of cataloging records in machine-readable form, in both public and private hands. As noted in Section II, many of the state library agencies maintain a union catalog and a union list of serials, as do some of the large institutions within certain states. An immediate benefit of Western Network operations would come just from inventorying these data bases and helping to make them available to all libraries performing retrospective conversions. Future benefit would derive from integrating these data bases in various ways to reduce costs for maintaining a large file at different locations and to develop capabilities for locating and verifying materials for interlibrary loan.

Outside the West, there are other major bibliographic data bases to which western libraries should have access, such as the OCLC data base which now contains nearly two million catalog records and holdings of participating libraries. The CONSER data base for serials using the Minnesota Union List of Serials (MULS) is being generated at OCLC; bibliographic records for serials drawn from this data base are to be distributed through the MARC service by the Library of Congress and the Canadian National Library. LC is also preparing to make some of its files, such as the subject headings and in-process files, available -- but only through library networks -- for on-line searching.

Butler Associates has performed several surveys of cataloging data bases in the West and has determined that substantial overlaps in coverage exist between holdings in smaller libraries and the holdings of large public libraries such as Los Angeles County. This library system has maintained a file for production of bookform catalogs for many years. Other major public libraries in California also have machine-readable files, such as Los Angeles Public and Orange County Public. Among the larger libraries, there appears to be a growing sentiment in favor of replacing card catalogs with bookform or microform catalogs for convenience in maintenance, replication and distribution.

Some of the other major western cataloging data bases identified to date are described very briefly in the following paragraphs. Serials data bases, surveyed by the Project staff to identify an appropriate base for developing a union list of serials for Montana, are described in Appendix B.

(a) BALLOTS Data Bases:

In addition to the MARC file from January 1972, BALLOTS has four other files, providing an aggregate of almost half a million catalog records available for on-line searching. The Catalog Data File contains the machine-readable catalog record for every title processed for the Research Library since 1974 and, for MARC-based titles, from November 1972. This file exceeds 200,000 records in size, includes materials in over 100 languages, and contains records for monographs, serials, government documents, music, atlases, and microforms - essentially everything but manuscripts. The Catalog of the Meyer Memorial Library contains records for 85,000 titles selected mainly for undergraduate use.

The Reference/Authority File, based on the records in the Catalog Data File, contains personal names, corporate body names, and subject references. The file is used to direct the user automatically to the proper entry during searching. BALLOTS does not at this time automatically prevent users from adding new (and possible non-authoritative) entries nor does it currently support the generation of automatic changes to the file upon inclusion of a new term to replace a former term. As presently constituted, therefore, BALLOTS is not a full authority control system.

BALLOTS Catalog Data File records are very close to the full MARC standard. Modifications are currently being installed, which will bring all new records up to full MARC/ISBD standards. Also, by early 1977 BALLOTS records will accommodate holdings codes and local variations of entry, subject heading and call number to enable using libraries to tailor records to their own requirements without altering the MARC records themselves.

BALLOTS also has the In Process File (IPF), which contains descriptive cataloging for materials on order. Entries in this file may be copied automatically from MARC, the Catalog Data File, the Meyer File, or may be added if not available in those files. At any given time this file contains approximately 30,000 items.

(b) WLN Data Base:

WLN also has about half a million catalog records, including MARC records, in the data base it has been maintaining with the batch-mode system to build union catalogs for Washington libraries. Authority control records in the data base are used to help assure the quality of data in catalog records added by Washington libraries. The University of Washington serials records are to be added to the data base; at this point, it is not determined whether CONSER records will be used to supplement existing serials records, or

if CONSER records will be substituted for existing records. WLN records include location information. WLN records meet full MARC standards and are certifiable by LC.

(c) UCUCS-1:

The University of California's Union Catalog Supplement, covering the period 1963 to 1967, is available in machine-readable form. The quality of this data base is substandard, but editing and improvement of entries as they are used by others may make this file potentially useful for cataloging pre-MARC materials. The file is being licensed to two private vendors, Inovar and Blackwell, for their potential use in serving library customers in producing bookform catalogs and other cataloging products.

(d) Blackwell North America Data Bases:

This commercial vendor maintains data bases consisting of the full MARC file, the BNB (British National Bibliography) MARC file, and other catalog records contributed by customers, for a total of over 2,000,000 records, most of which are of high quality. These data bases are increasing at a rate of 3,000 records per week, and include cataloging for serials and nonprint materials as well as monographs. Blackwell will supply records to purchasers for $.10 - $.15, depending on volume.

(e) Autographics Data Base:

This commercial vendor has a data base representing the holdings of several large public libraries in different parts of the country. The firm has assisted several western libraries in preparing data bases for their circulation control system purchased from CLSI. For Marin County Public Library, Autographics is converting records output by BALLOTS for newly cataloged items into CLSI file updates, as well as updating the library's microform catalog. In converting Marin County's catalog, Autographics charged $.25 per record furnished from its own data bases.

(f) NICEM Data Base:

The National Information Center for Educational Media (NICEM) is located on the campus of the University of Southern California. This organization maintains a file of almost half a million entries for audiovisual materials, cataloged in collaboration with the Library of Congress. To date, this file is used only for publication of indices to media, but its potential for other uses and on-line searching warrants consideration, particularly since in many libraries such materials represent a growing proportion of the total collection.

Inventory Data Bases

Inventory data bases contain records for the holdings of one or more libraries. While holdings data may be included in cataloging data bases maintained by the bibliographic utilities, such information may indicate only that a particular library organization has at some time acquired a copy of a particular title. In fact, the library may no longer hold the title, or the physical item may be located in a branch library or special collection. The function of a catalog data base is to provide a standard description for books and other materials. The function of an inventory data base is to identify the libraries holding copies of particular books or other materials, and the data base may go further to keep track of the current physical location of each physical item held by a library.

Numeric registers are one type of inventory data base. A numeric register normally contains only a standard identifier for a book or other material, such as its LC card number, and a list of codes designating the libraries holding copies of the item. Numeric registers are in use for the states of Arizona and New Mexico. CSUC also maintains a numeric register for libraries in that system.

A file used for circulation control is another type of inventory data base. Circulation control files could be used to generate numeric registers to build a regional location file quite economically. For example, the inventory data bases of most of the 11 western libraries with CLSI LIBS 100 circulation control systems contain the data (according to a survey we made in December) necessary for a numeric register.

Another use for inventory control data bases, as envisioned in library planning at CSUC, is to support interconnection of library circulation control systems so that one library can find out what other libraries hold an item. The library can then access a holding library's own circulation control file to determine the availability of the item and to place a hold or ILL request on it directly through the circulation control system.

Use of Data Bases by the Western Network

As indicated even by this brief review, there are a number of sources for machine-readable data that could be tapped by western libraries, particularly those considering retrospective conversion of their shelf lists. There are many pitfalls, however, in trying to use existing bibliographic data for cataloging purposes. The quality of many of the data bases is open to serious question, and even when records meet the MARC standard for both structure and content some libraries will require adaptation of record content to conform to local cataloging practices. Computer manipulation of existing bibliographic data, when all cost factors are considered, may in some instances turn out to be considerably more expensive than rekeyboarding data. (For example, the data in a numeric register record can be keyed for about $.02; the lowest price for retrieving a record from an existing file is about $.10 per record, and the data may still need to be processed to create the record structure required for the numeric register.)

Despite the potential problems, the existing machine-readable data bases are a rich resource for users where stringent requirements for quality of cataloging can be relaxed or records can be economically brought up to standard. For example, it might be desirable to build data bases from existing records that are adequate for performing the verifying and locating functions for interlibrary loan even though the records are not fully up to cataloging standards. As long as the standard and non-standard records are not intermingled in one data base, a utility such as WLN or BALLOTS could provide access for using libraries to both kinds of records to satisfy interlibrary loan and circulation or inventory control, as well as technical processing needs.

V. TELECOMMUNICATIONS

Significance for Network Operations

Contemporary library networks are based largely on the technology of distributed rather than centralized data processing. Distributed data processing for library networks employs a centralized computer center for maintaining very large files of general interest (e.g., MARC cataloging data or citation files), terminals (which may actually be small computers themselves) and a communications network by which local terminals and the central computer can be interconnected. Centralized data processing, running in batch mode, is analogous to the postal service where a message is transmitted by courier and a response is eventually returned by the same means. What the telephone did to improve communication between two people at a distance, the telecommunications network does for data processing. The benefits to be derived from immediate and interactive access to data, information, and materials at other locations increases a library's effectiveness for supplying service to patrons far beyond the limits determined by the library's own collection and the knowledge of its staff. Telecommunications provides patron access to the total resources of the network, and the larger system of which the network is a part, both nationally and internationally.

Telecommunications represents a large proportion of the costs now being spent on computer support for library operations. As a minimum, NELINET, which is geographically close to Columbus, Ohio, currently spends about $150,000 annually for communications to OCLC, and this is about 15% of the total charge for OCLC use. For on-line searching of data bases, the communications charge is about $8-10 (using Tymshare or Telenet) per hour for connection to major cities, plus local tolls for libraries located outside a metropolitan area, or about 10-40% of the total charge for on-line searching. Because telecommunications costs are closely linked to distance and volume of traffic carried, the West is faced with the prospect of relatively high costs for interlibrary communication. The distances in the region to be covered are very large, as compared to the East, and there are very few major population centers. Furthermore, the states of Alaska and Hawaii are treated by the Federal Communications Commission (FCC) as foreign countries when it comes to setting rates and designating what firms will be allowed to provide communications services.

The Western Network must use available telecommunications to begin operations. Before long, the Network must be able to invest in development of equipment and procedures needed to reduce telecommunications costs and increase the efficiency of interlibrary and inter-computer communication.

Requirements for Network Telecommunications

In a network, librarians need to be able to talk with other librarians for many purposes: for reference assistance, for coordination, for acquiring "how-to-do-it" information, and so on. Since meetings are costly in terms of time and travel, telecommunications (in this case, telephone service) provide a very convenient and efficient means for such interlibrary verbal and interactive communication. Not to belabor the point, a network must give attention to telephone service to ensure that this communications mode is used as effectively and economically as possible. Even telephone service can often be provided at a cheaper rate by a private network than by customers dealing individually with the telephone company. Several of the states, such as Washington, Montana and California, in recognition of this fact, have established state offices to coordinate state communications networks. For example, Washington estimates that between 5 and 7 million dollars are saved statewide annually by use of a centralized office to handle telephone service to state agencies. There is a possibility that tax-supported libraries could take advantage of such state services to obtain telephone service at lower cost than charged by the telephone company.

Libraries need to transmit and receive complete messages, such as interlibrary loan requests. The messages must be available in hard copy form to save the recipient from having to write it down and also to ensure that the message received is exactly the same as the message transmitted. Many libraries currently use teletype services, Telex or TWX, for this purpose.

With the availability of centralized computer services, libraries now need to be able to exchange data through direct communication with the computer. Data, in this discussion, are alphanumeric characters represented by digital codes -- the language of computers. Transmission rate is an important characteristic in data communications; for library use, the rate is generally expressed as the number of characters transmitted per second (cps). Current telecommunications services provide transmission rates of 10, 15, 30, 120, 240, 480 or 960 cps over telephone circuits, as well as much higher rates for bulk data transmission over broadband circuits. Connection time is also an important factor; "dial-up" connections usually are established for brief periods of time such as a few minutes to an hour or two, while "permanent"

connections may last for long periods of time such as a whole day. Source and destination for transmission are a third important factor in discussing data communications; point-to-point communications almost always use the same source and destination for each transmission, while switched circuit communications may use different sources or destinations for each transmission. Telephone service is an example of switched circuit communication, while a terminal connected directly to the OCLC computer center is an example of point-to-point communication.

Computer-based bibliographic utilities now offer two basic kinds of use for their services. One use is for looking up information in a file; on-line search services represent this kind of use. The other use is for data entry and manipulation; cataloging services are an example of this kind of use. The characteristics of each kind of use are very different. For file look-up, data transmissions tend to be short (one to ten or so lines of message per transmission) and complete transactions or searches tend to be brief (a few minutes to an hour or so). For data entry and manipulation, data transmissions tend to be lengthy (10 to 24 lines, or a full terminal display screen at a time) and transactions, while relatively brief, are likely to be combined so that connection with the computer continues for long periods of time.

A transmission rate of 10 or 15 cps is too slow for either type of use. While the amount of data being transmitted for file look-up is often small enough that the low transmission rate is technically adequate, the speed with which characters appear to the human sitting at the terminal is agonizingly slow; people read at a faster rate. The 30 cps rate, however, is acceptably close to normal reading speed for short messages. If a message is lengthy, such as a citation that includes an abstract, then a higher transmission rate is desirable; people can easily skim a message at the 120 cps rate. For the data entry and manipulation kind of use, the 120 cps transmission rate is minimum if a terminal operator is to be able to work at full speed; the 30 cps rate can be used, but at a cost of degraded operator efficiency.

Because there are several computer utilities that an individual library may wish to use, a switched circuit telecommunications system is required. Although cataloging and acquisition support might be obtained from only a single utility over the short term, so that point-to-point communication could be used, libraries must have sufficient flexibility that they can shift at will to communicate with other utilities without making additional investment in equipment or telecommunications service. Furthermore, the computer-

and-terminal network for support of technical processing and reference operations also offers a potential capability for message handling even better suited to library intercommunication needs than the present day teletype service. Thus, the requirement for switched circuit communications is even more important in making the network adaptable to future needs.

Types of Telecommunications Services Available

In addition to telephone service, there are TWX or Telex services, specialized common carriers offering data services on the standard public communications network, value-added networks using common carrier nets plus minicomputer-based processing to increase efficiency for data transmission, and private networks.

Many libraries use TWX or a similar service to communicate inter-library loan requests and other messages among themselves or to central locations. TWX service requires that each library have a teletype machine on which the messages are entered or written, either directly or through use of paper tape. Transmission speed is limited to 10 cps which is adequate for non-interactive use, such as transmitting ILL requests or similar messages not requiring immediate response. The teletypes can also be used as terminals to access on-line reference services such as those provided by SDC and Lockheed, but their slow transmission rate argues against such use. Telex service is cheaper than TWX, but it uses a 5-level code and cannot connect directly to a computer. TWX supports upper case characters only, although teletype machines (such as the Model 37 and 38) are available with upper and lower case. Teletype service uses circuits similar to phone circuits, except that the circuits have narrower bandwidths. Transmission costs are analogous to telephone charges in that they are based on distance, amount of time used, and basic monthly service charges.

The standard telephone system can be used for data as well as voice transmission at rates up to 480 cps. Normal telephone rates apply, based on distance and amount of time used. If volume warrants, a WATS rate may prove cheaper than normal long distance charges; for example, Zone 1 WATS service, which would cover from Washington to Montana, costs about $1500 per month for 240 hours use.

The specialized common carrier used most for library data transmission currently is TYMSHARE, which operates the TYMNET system in most major cities to provide data transmission at a fixed cost, independent of distance. TYMNET supports transmission speeds of 10, 15 or 30 cps and will soon introduce 120 cps service. For libraries that are not located within the local calling area of a TYMNET node, such as a library in a rural area, there is an additional cost for the phone call to the nearest city with a node. TYMNET nodes in the West are located (or will be soon) in Vancouver, Calgary, Seattle, Portland, San Francisco area, Los Angeles area, San Diego, Salt Lake City, Phoenix, Denver, and Honolulu. A node can be established anywhere, and costs about $2,000 per month for operation. Transmission charges quoted by TYMSHARE range from $4 to $7 per hour, regardless of distance.

One value-added network has just been established as a competitor to TYMSHARE: the Telenet Communications Corporation, which uses packet-switching rather than circuit-switching for data transmission. In circuit-switching networks such as TYMNET or the telephone and teletype systems, a single circuit (unless multiplexing or multidropping techniques are employed) is established each time a terminal connects to the telecommunications system, and this circuit remains in use until the terminal (or computer) disconnects. While the circuit is in use, other terminals cannot make use of it (unless special techniques such as multidropping, described below, are used); and they may in fact be locked out because all circuits available are in use. With packet-switching, however, data to be transmitted are broken up into small blocks or packets and these are sent one at a time over any circuit that is not currently transmitting a packet. In essence, this allows a circuit to be broken down into sub-circuits, so that one line may carry messages for other users when not being used by the first user. In effect, then, packet-switching provides for a more efficient use of a communications network since lines can be shared by users until all lines are totally busy. This translates into a potential for cheaper communications for data users than is possible through the use of voice channels and circuit-switching networks. For example, initial estimates for Telenet prices are about 20% less than for TYMSHARE prices for somewhat comparable use.

The services just described are most useful for dial-up, switched circuit communications where connect time is relatively short and transmission sources and destinations are varied. In using on-line cataloging systems such as OCLC, BALLOTS, and WLN, terminals must remain connected to the same destination computer for lengthy periods of time. Dial-up communications charges are excessive for this kind of use. Instead, a permanent circuit is

required, perhaps one leased from a common carrier. Because the cost of a private line is very high, it is economically desirable to have several users sharing the same line for data transmission. This is accomplished by multi-dropping, or connecting 20 or 30 terminals to the same line, and thus to the same central computer. A polling discipline is frequently employed in the multidrop network. This discipline requires that the computer poll or check each connected terminal in turn to see if a message is waiting for transmission. Thus, each user takes a turn in using the transmission line. Since transmission takes very little time, the delay introduced by this waiting in line is not very noticeable until the total capacity of the transmission line is approached.

Point-to-point communication over permanent circuits is normally provided by means of a private telecommunications network. In most cases, the private network consists of lines leased from a common carrier such as the Bell System or Western Union. Charges for a leased line from these sources range from $.55 to $3.00 per airline mile per month, under terms of tariff agreements established by the FCC. The lower rate, as you might expect, applies to communications between major cities, and the higher rate is for rural use. Western Union claims to be able to provide a private network for 10-15% less than the Bell System in many regions of the country. MCI Communications Corporation and DATRAN are also potential suppliers of circuits for a private network, and for providing broadband circuits for high speed data transmission such as might be needed to interconnect BALLOTS and WLN. However, state governments can obtain excess telephone circuits leased by the General Service Administration (GSA) for the federal government; these circuits cost about $.54 per mile per month. It appears that tax-supported libraries can utilize these circuits at the GSA rate; we have had preliminary conversations with the state of Montana in regard to leasing a line between WLN and Billings that would cost about $600 per month.

Most states, and some smaller jurisdictions, already have private networks in place. These are used primarily by law enforcement agencies, and may employ microwave transmitters as well as telephone or telegraph lines. Unfortunately, these public safety networks are not available for use by libraries, but their existence suggests a source of expertise in data and voice communications that a library network should be able to tap. California is installing a private data transmission system called ATSS-DS that may be used to support CSUC library data communications between the 19 campuses of that institution.

In general, users of telecommunications services are not much affected by the type of transmission used by the common carrier providing the services. However, users should be concerned in how service tariffs, or charges, are set. These are affected by the type of transmission used as well as the volume of traffic from point to point, and the tariffs are regulated or set by the FCC and state Public Utility Commissions. For the West, increased use of satellite transmission, which tends to reduce the effects of distance on communication system costs, ought to be translated into lower tariffs for telecommunications in sparsely populated areas and for links to Hawaii and Alaska.

Although satellite communication is not immediately available as a service that the Western Network might employ directly, experimentation with this technology is continuing in the region through the SALINET project. A new satellite, the Communications Technology Satellite (CTS) has just been launched and will be stationed over the region. The SALINET project is based at the University of Denver, under the direction of Margaret Goggin, Dean of the Library School. The project is concerned mostly with video transmission, rather than data communications, but video would be especially useful for continuing education and training of librarians, and potentially for facsimile transmission. A Public Service Satellite Consortium (PSSC) has been formed to provide an agency by which potential public sector users of CTS and other satellites might gain access to such a communications capability. WICHE has joined PSSC, which is considering the possibility of providing a range of telecommunications services in addition to satellite transmission.

Putting Telecommunications Components Together

Given the services offered by the common carriers, either on a dial-up or leased line basis, there are a number of other components that can be added to develop an economical telecommunications system for meeting a library network's requirements. Up to this point we have discussed only the transmission facilities, not mentioning all the kinds of data communications equipment and procedures needed to hook the source and destination to the transmission network in an economical way. Three general classes of such devices are terminals, modems, and data handlers.

There are a host of computer terminals on the market. For dial-up service, there is a wide variety of video display terminals, and a smaller selection of printing terminals, suitable for the file look-up kind of use. Inexpensive printing terminals are limited to the 30 cps transmission rate; higher speed terminals are available, and there is a chance that their prices will decline. For permanent connection service, however, the selection is far more limited. Terminals, to participate in polling, must have more capability than terminals used in dial-up service, and thus are more expensive. Polling also requires special hardware and software at the central computer. Terminals for use with the WLN system, which utilizes the IBM bi-synchronous line discipline for polling, must be capable of synchronous transmission, but most terminals being marketed operate asynchronously. Furthermore, terminals used in cataloging should have the full MARC character set available; this capability limits the field to only a few choices.

Modems (or data sets or couplers), are devices that translate between the digital code used by terminals and computers and the waveform signal carried by transmission networks. There are a variety of these devices on the market, again with widely differing capabilities. For example, one device can monitor the quality of the signal on the transmission line and alert the terminal operator if the signal goes out of tolerance. Many terminals designed to operate at 30 cps have a modem built in. For higher transmission rates, more elaborate (and expensive) modems are necessary.

Data handlers are devices such as multiplexors, concentrators and switchers that package data in ways that take fullest advantage of the capacity of transmission lines; the devices may also be used in collaboration

with a large central computer to relieve that machine of time-consuming data handling chores for receiving or transmitting data over the telecommunications network. Data handlers may be small computer systems themselves, and thus offer capabilities that may warrant their operation by the owner of a private network rather than by the common carrier. NELINET, for example, is setting up a minicomputer for data handling between New England libraries and the transmission line to OCLC, both to reduce communication costs and to provide a private message system with capabilities similar to TWX.

A data handler would also be useful as a means for providing an automatic or semi-automatic switch from one computer utility to another. Now, a terminal operator must disconnect from one utility and connect to another to make this switch, and matters are further complicated by the fact that each utility uses a different set of user commands by which the terminal operator "talks" with the computer. A data handler used as an automatic switch might perform the transfer from one utility to another without disconnecting the terminal and might in addition perform some translation between one utility's command language and the other so that the terminal operator has only one language to deal with.

The complexity of the equipment and services needed to provide effective telecommunications to libraries at an economical cost argues the desirability of regional and national networks undertaking the role of research, development and management of telecommunications services. The necessity for setting technical standards that promote interconnection of computer-based bibliographic utilities and of libraries in different areas of the country also indicates the need for a strong organization that can represent users' requirements in dealing with the bibliographic utilities and with the federal and local agencies concerned in setting telecommunications policies and tariffs.

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DEFINITION OF ACRONYMS AND TERMS

Access Point - A data element in a bibliographic record that is indexed to allow retrieval on values for that element. For example, catalog records usually have at least author, title and subject access points.

ACM Periodical Bank - The Associated Colleges of the Midwest operate a document photocopy service based on a collection of about 2,000 periodicals contributed by midwestern small liberal arts colleges, and on the holdings of the Newberry, John Crerar and other major libraries in Chicago.

Amigos Bibliographic Council - A bibliographic network operating in Texas and the Southwest. Amigos is headquartered at Richardson, Texas, and is a successor to the Texas Interuniversity Council/OCLC network project.

ARL - Association of Research Libraries. A non-profit organization of large libraries (over one million volumes) chartered to assist in addressing common problems and concerns.

Authority Control - Use of lists of authorized forms of names, series titles, subject headings and similar elements in a catalog record against which new records can be validated to ensure that standard values are used for such elements that may be used as access points for the catalog.

BALLOTS - Bibliographic Automation of Large Library Operations using a Time-sharing System. This system, initially developed at Stanford University, began daily on-line operation in November 1972.

BCR - Bibliographical Center for Research, Rocky Mountain Region, Inc., Denver, Colorado, formerly known as the Rocky Mountain Bibliographic Center.

BCS - Boeing Computer Services, a vendor responsible for developing the on-line bibliographic system for the Washington Library Network. BCS also offers consulting services for library system analysis and design.

BIBCARD - A catalog card printing program developed by the University of California.

Bibliographic Center (Bibcenter) - An organization maintaining a very large union catalog, usually covering libraries in a multistate area, that provides location information and other interlibrary loan assistance.

Bibliographic Utility - An organization that provides bibliographic services and products, usually based on operation of an on-line computer system, to libraries on a more or less public basis.

BIBNET - A system for acquiring cataloging data from an on-line file, then editing the data for local use (or inputting new records) by means of a minicomputer terminal; developed by Information Dynamics Corp., Reading, Mass.

BLLD - British Library Lending Division, Boston Spa, England, maintains a nearly complete set of the world's current serials and many back files, and operates a document photocopy service.

B/NA - Blackwell of North America, Inc., a vendor of catologing services and products.

BNB - British National Bibliography.

CATLINE - An on-line version of the National Library of Medicine's catalog, containing recent acquisitions.

CHAIN - Channelled Arizona Information Network, a TWX-based communications network supporting interlibrary loan.

CIP - Cataloging-in-publication, by arrangement between publishers and the Library of Congress, provides nearly complete cataloging data for a book on the reverse of the title page.

CLASS - California Library Authority for Systems and Services. A joint exercise of powers agreement with signatories from six groups: the State Library, University of California, California State University and Colleges, county libraries, city libraries, and community colleges.

CLSI - Computer Library Services, Inc., Newtonville, Mass. This firm produces a turnkey minicomputer-based system for circulation control and acquisitions.

Common Carrier - A firm such as a telephone company that provides telecommunications services on a public basis.

CONSER Project - A project partially funded by the Council on Library Resources to expedite the creation of machine-readable records for serials titles. It is a joint activity involving the University of Minnesota and the Ohio College Library Center.

Consortium - A group of libraries cooperating under terms of a formal agreement, but usually without a headquarters staff or a director that exercises operational control over group activity.

cps - Characters per second, a measure of the transmission rate for telecommunications circuits and equipment.

CSLUC - California State Library Union Catalog, Sacramento, California.

CSUC - California State University and Colleges, a system that includes 19 state-supported universities and colleges.

CULP - California Union List of Periodicals, California State Library.

ERIC - Educational Resources Information Center, Washington, D. C., a National information indexing network of clearinghouses for educational material.

FCC - Federal Communications Commission, which sets charges for telecommunications services provided by common carriers and regulates their operation.

Find Ratio - The percentage of successful searches compared to total searches of records in an on-line data base. Also called "hit rate."

Front End Processor - A minicomputer operating between a large computer and telecommunications lines to perform data handling and communications functions, thereby allowing the large computer to concentrate on data operations.

FTE - Full time equivalence, normally interpreted to mean the dedication of 40 hours a week for 52 weeks of a staff person's time.

GSA - General Services Administration of the federal government. GSA leases telecommunications circuits excess to federal requirements to the states; charges for such circuits are lower than for circuits obtained from a common carrier.

Hit Rate - Also called find ratio, the number of searches that retrieve one or more records compared to the total number of successful and unsuccessful searches.

Holder Code - A code that uniquely identifies a library, used in union catalogs and lists to show what libraries hold an item.

IDC - Information Dynamics Corporation, which provides the BIBNET system and the MCRS cataloging data service.

ILL - Interlibrary Loan

ILR - Interlibrary reference, usually performed under pre-established procedures whereby one library can call on another for assistance in obtaining answers to patron questions.

Intertype Library Network - A group of libraries, cooperating on a formal basis, that has members of more than one type; e.g., a group that includes public, academic, and special libraries.

ISBN - International Standard Book Number, assigned by publishers as a unique identifier for titles that they publish.

ISSN - International Standard Serial Number, assigned by a central organization in each country (LC in the United States) as a unique identifier for a serial publication.

IUC/OCLC - The Inter-University Council, composed of a consortium of fourteen universities in the North Texas area using the services of the Ohio College LIbrary Center.

KIC - Kansas Information Circuit, a TWX-based interlibrary communication network.

LC - Library of Congress

LCCN - Library of Congress Catalog Card Number, a commonly used means of identifying a particular catalog record in machine-readable data bases corresponding to a specific item of library material, usually a monograph.

LIBS 100 - A minicomputer-based, turnkey, library system offered by CLSI for support of circulation control and acquisitions.

LITTY - Library Teletype Network, a Dataphone-based interlibrary communication network in Idaho.

Location (holdings) - The bibliographic centers use these two words synonymously to indicate which libraries contain a given item.

MARC - Machine-Readable Cataloging developed at the Library of Congress and following national and international standards for format, content designators and character sets.

MCRS - Micrographic Catalog Retrieval System, a listing of cataloging data on microfiche, offered by Information Dynamics Corp., Reading, Mass.

MEDLINE - The on-line version of the National Library of Medicine's Index Medicus.

Megabyte - 1,000,000 bytes or characters of storage capacity.

MIDLNET - Midwest Region Library Network, a regional network covering several states, and a neighbor of the Western Network.

Multidrop - A type of communications network in which several terminals share the same circuit to a computer, thereby reducing the per terminal cost for telecommunications.

NCLIS - The National Commission on Libraries and Information Science, appointed by the President of the United States for the study and planning of improved library and information services in the nation.

NICEM - National Information Center for Educational Materials, University of Southern California, maintains a catalog data base and publishes catalogs and indexes for non-book educational materials.

NELINET - The New England Library Information Network, a non-profit organization operated by the New England Board of Higher Education and designed to serve the libraries in six states.

NLM - National Library of Medicine, which provides the planning and financing for the National Bio medical Communications Network and the Regional Medical Libraries Network.

NTIS - National Technical Information Service, a federal agency that distributes technical reports produced by or for the federal government.

NUC - National Union Catalog, a publication providing catalog records and a list of libraries holding each item, as reported to the Library of Congress.

Numeric Register - An index to libraries holding a particular title, accessed by the LCCN, ISBN, or ISSN for the title.

OCLC - Ohio College Library Center, a non-profit corporation chartered in the state of Ohio to provide computer cataloging support for member libraries through remote terminals operated on-line to the central computer system in Columbus, Ohio.

OEM - Original equipment manufacturer. Many computer equipment suppliers sell only to manufacturers rather than to end users; the manufacturers then incorporate the equipment in a product that is marketed to users. Where equipment is sold to end users as well as manufacturers, the latter obtain the advantage of a lower "OEM price", under the assumption that they will purchase the equipment in volume.

On-Line - Designating the operation of a computer system such that a user working at a terminal has immediate access to the contents of data bases handled by that system.

On-Line Reference - Use of an on-line computer system to search bibliographic data bases to obtain lists of citations, abstracts, or information.

OSSHE - Oregon State System of Higher Education.

PACFORNET - Pacific Coast Forest Research Information Network, U. S. Forest Service.

PLAN - Public Library Automation Network. An experimental network, sponsored by the California State Library, of seven California public libraries using BALLOTS.

PNBC - The Pacific Northwest Bibliographic Center, located at the University of Washington, Seattle, Washington. PNBC maintains a file of the holdings of 47 northwestern libraries and provides location service to libraries requesting an interlibrary loan.

PNRHSL - Pacific Northwest Regional Health Sciences Library, an NLM network resource center located at the University of Washington.

Polling - A procedure used in a configuration where several terminals share the same communications circuit to a computer; the computer checks each terminal in turn to accept a message from that terminal.

Programmable Terminal - A computer terminal that contains sufficient memory and computational capability that terminal functions can be controlled through operation of a user- or computer-provided program. In effect, the terminal itself is a small computer.

PSRMLS - Pacific Southwest Regional Medical Library Service, an NLM network resource center serving Hawaii, California, Arizona, and Nevada, located at the Biomedical Library, UCLA.

RML - Regional Medical Library, a resource center having a performance contract with the National Library of Medicine to provide specified photocopy, training, and other services to medical libraries in a multistate region.

SALINET Project - This is a joint project of the University of Denver, the University of Kansas and the Federation of Rocky Mountain States in which the use of a NASA satellite is to be explored for providing transmission of compressed bibliographic data and library continuing education activities. The principle investigator is Dr. Margaret Goggin at the University of Denver.

SCAN - Southern California Answering Network, an interlibrary reference service headquartered at Los Angeles Public Library.

SCILL - Southern California Inter-Library Loan network, headquartered at Los Angeles Public Library.

SDC - System Development Corporation, Santa Monica, California. SDC Search Service provides on-line access to large bibliographic and information files to users at terminals throughout the U. S. and elsewhere. The basic computer program system which supports this service is known as ORBIT.

Search Services - On-line retrieval of citations or data from data bases and using a computer system maintained by vendors such as SDC or Lockheed, or by non-commercial organizations.

SERLINE - An on-line data base maintained by the National Library of Medicine to show serial holdings.

SLICE - Southwestern Library Interstate Cooperative Endeavor, a project of the Southwestern Library Association, which involves the states of Arizona, New Mexico, Texas, Oklahoma, Arkansas and Louisiana, and which were partially funded by the six state library agencies and the Council on Library Resources.

SMERC - San Mateo Educational Resource Center, a document delivery center for educational information materials such as ERIC reports.

SOLINET - A non-profit organization which provides the legal, organizational and financial structure for libraries in the southeast to tie-in to the Ohio College Library Center.

System Prompt - In an on-line computer system, the system may indicate the need for the user to take an action by such means as presenting a display of a form to be filled in, causing portions of the display to blink, printing the word USER: or a symbol to cue the user to write something in.

TALON - Texas, Arkansas, Louisiana, Oklahoma, New Mexico regional medical library, headquartered at the University of Texas Southwest Medical School, Dallas.

Tariff - A rate for telecommunications service by a common or specialized carrier, approved by the FCC or a state public utilities commission.

Telex - A teletypewriter exchange service that uses a 5 level code and thus cannot connect directly to a computer.

TWX - Teletypewriter Exchange which is now operated by Western Union and permits the exchange of messages among libraries or any other organization in the system having a TWX machine.

TYMNET - A telecommunications network of the TYMSHARE Corporation, offering switched circuit communications on a dial-up basis for a fixed rate, regardless of distance. TYMNET nodes, where a user can enter the network, have been placed in most major cities.

UC - University of California, a system of nine campuses: Berkeley, Davis, Irvine, Los Angeles, Riverside, San Diego, San Francisco Medical School, Santa Barbara, and Santa Cruz. Thus, UCB refers to the Berkeley campus, UCLA to the Los Angeles campus, and so on.

UCUCS - University of California Union Catalog Supplement. UCUCS-1 is a machine-readable file covering the pre-MARC period 1963-1967.

ULAP - Universitywide Library Automation Program of the University of California, headquartered at UCB.

Union Catalog - A library catalog that indicates what libraries hold each item listed.

Union List - A list, usually of serials, that shows what libraries hold each title.

USC - University of Southern California, Los Angeles.

Validation - The process of checking the value of a data element in an input record against a list of authorized values, or checking for inter-element consistency.

WDPA - Washington Data Processing Authority, a state agency recently established to coordinate the use and expenditures for computer systems for all state agencies in Washington.

WESRAC - Western Research Applications Center, University of Southern California, a source for copies of NTIS-distributed technical reports.

Western States - Refers to the 13 states in the WICHE compact plus the 4 states to the east (North Dakota, South Dakota, Nebraska and Kansas) and British Columbia.

WICHE - Western Interstate Commission for Higher Education, a non-profit organization created by an interstate compact of 13 states in 1953. It is dedicated to cooperative improvement of higher education throughout these 13 western states by the sharing of resources and expertise in that multi-state region. The basic program (student exchange across state lines) is funded by state legislatures. The other 50 programs are individually funded through grants or contracts.

WLN - Washington (state) Library Network, supported by its own computer-based bibliographic utility which will provide on-line service beginning in 1976.

APPENDIX A

N-15/000/00

SUMMARY OF SURVEY OF WESTERN LIBRARIES

HAVING A LIBS 100 CIRCULATION CONTROL SYSTEM

In November, 1975, the Project Staff mailed a questionnaire to 11 western libraries having a Computer Library Services, Inc., (CLSI) turnkey circulation control system, the LIBS 100. The main purpose of the survey was to determine how many of these libraries were generating inventory control files that could be linked via Library of Congress card number (LCCN) or International Standard Book Number (ISBN) to catalog records in a regional bibliographic data base or that could be merged with data from other libraries to create cheaply a numeric register of holdings.

One library did not respond to the survey. Of the ten respondents, all but one is a city or county public library; the other is an academic library. Questionnaires were mailed on 18 November and nine replies were received by 16 December 1975; the last reply was received on 4 March 1976. One or two of the respondents were in the process of building their circulation control title file and were not yet operational using the system.

Because of the great differences in the data provided by the respondents, the survey results have simply been tabulated, as displayed in the attached table. It is a little disappointing that some libraries are not recording the LCCN, which would provide a common access point to their holdings. No libraries appear to be including serials in their circulation title file. All the libraries but one keyboarded most or all of their own data to create and maintain the title file rather than obtaining machine-readable records from an existing file.

It would be desirable if all libraries would include the LCCN or ISBN in their records to facilitate access to and use of their records by other libraries. Currently, it is technically feasible to set up a communications system permitting one library to look at another library's circulation file to determine whether or not a particular title is available, not just held by that library. Furthermore, if other libraries were to purchase the LIBS 100 system, it might be economical for them to use another library's exsiting LIBS 100 file as a source for the title records needed rather than to rekey the data or reformat records from a bibliographic data base to the structure required for the LIBS 100 system.

CLSI LIBS 100 CIRCULATION CONTROL TITLE DATA BASES IN THE WEST, DECEMBER 1975

	Libraries									
	A	B	C	D	E	F	G	H	I	J
# of Terminals	3	15	15	8	2	8	16	5	4	24
# of Titles (ooo's)	360	110	105	116	82	280	160	40	49	126
# of Volumes (ooo's)	385	225	170	139	127	?	700	73	56	500
Data Elements Included:										
LC card #	0%	25%	50%	70%	40%	1%*	0%	70%	0%	10%
Local call #	100%	100%	100%	100%	100%	100%	100%**	75%	100%	100%
Year published	0%	99%	99%	90%	100%	90%	98%	98%	10%	100%
Edition	no	yes	yes	yes	no	yes	no	yes	yes	yes
Materials Included:										
Books (hardcover)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Paperbacks	no	yes	yes	yes	yes	no	no	no	no	yes
Periodicals	no	no	yes	no	no	no	no	yes	yes	yes
Records/cassettes	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
Prints/pictures	no	no	no	yes	yes	yes	no	yes	no	no
Framed Art	no	no	yes	yes	no	no	no	no	no	no
Pamphlets	no	no	no	no	yes	no	no	yes	no	yes
Audio-visual kits	no	no	no	no	yes	no	no	no	no	no
Films	no	no	no	yes	no	no	no	yes	no	yes
Music scores	no	no	no	no	no	no	no	no	no	no
Games	no	no	no	no	yes	no	no	yes	no	yes
Maps	no	no	no	no	no	no	no	no	yes	yes
Microforms										
Titles Added/wk	600	150	2000	1100	1230	N/A	250	1200	375	175
Copies Added/wk	?	450	3500	1150	1933	"	2000	2000	475	1000
Records Changed/wk	200	75	?	10	10	"	?	20	?	?
Copies Deleted/wk	?	40	few	10	10	"	250	25	?	300
Titles Deleted/wk	?	15	few	5	?	"	10	2	?	15

APPENDIX B

N-16/000/01

SURVEY OF UNION SERIALS DATA BASES IN THE WEST

INTRODUCTION

The Western Network Project staff in February 1976 conducted a survey of organizations in the West or close by that maintain a union serials data base. The purpose of the survey was to identify data bases that would make a suitable starting point for creating a union list of serials for the state of Montana.

Nine organizations maintaining a serials data base were identified:

University of Denver
California State Library: California Union List of Periodicals (CULP)
Portland State University: Oregon Regional Union List of Serials (ORULS)
Washington Library Network (starting with the serials list of the University of Washington)
East Washington State College: Spokane Area Combined List
University of Minnesota: Minnesota Union List of Serials (MULS)
Stanford University
University of California
California State University and Colleges

The data bases of the California universities were not included in this survey since they do not include public and special library holdings that would be desirable in creating a state-based union list and because of their large size.

The Western Network Project staff wishes to take this opportunity to thank the librarians responding to the survey. Each of them invested a great amount of effort in answering all questions most completely and in furnishing additional descriptive material. This is very concrete evidence for the strength of the cooperative spirit in the West.

UNIVERSITY OF DENVER (DU)

Under the leadership of Ward Shaw, Associate Library Director, DU recently created a union list of serials and associated data base for four Colorado universities, the Denver Public Library, and a medical library. Since the major objective of the project was to produce a finding tool as rapidly as possible, no time was spent on developing complete and authoritative records. The resulting product is a simple title-holdings statement list that fulfills the basic requirement. The file structure is non-MARC. The character set is limited to uppercase.

CALIFORNIA UNION LIST OF PERIODICALS (CULP)

The California State Library staff, under the direction of Gerald Newton, Chief, Technical Services Bureau, produces this union list which includes many public and community college libraries throughout the state, as well as special libraries in the northern California region. Records for main entries do not include abbreviated titles, publisher, LCCN, or language, but ISSNs are entered. Publication place is indicated when necessary to distinguish between similar titles. Cross references are being added for variant titles. Data in the file have been verified against standard sources, and it is estimated that 90% of the entries are accurate. Filing rules are programmed, and are thus simpler than LC filing rules for dictionary catalogs. The file structure is MARC(S), with an upper and lower case character set, but without diacritics. Half of the entries have been verified against NUC, NST, etc. About 10% of the entries are known to be inaccurate, mainly because they are misidentified or are entered under the wrong title.

CULP is being expanded to cover more junior college and public libraries and to include special libraries in southern California. New editions are being published on microfiche twice a year. The State Library is willing to provide modest assistance to libraries in other states in developing their own union lists.

OREGON UNION LIST OF SERIALS (ORULS)

Daphne Hoffman has been in charge of producing this union list representing many of the academic and junior college libraries in the state of Oregon, together with several special libraries and the Library Association of Portland (the city's public library). Main entries are relatively complete except for publisher, language and (unfortunately, perhaps, for a capability for linking to CONSER records) LC card number (LCCN) or International Standard Serials Number (ISSN). Cross-references are included to link current titles with earlier or different versions of the titles. Data in the file have been verified against NUC, NST, etc., and entries are considered to be authoritative. Entries are filed according to a numeric code that is manually assigned. The file structure is non-MARC, and only uppercase characters are used.

The ORULS project will cease operation after June 1976, and no firm plans have been made regarding any continuation or a disposition for the data base. Staff had hoped that a follow-on project might provide for merging ORULS with the WLN data base, or at least for adding LCCNs and ISSNs.

WASHINGTON LIBRARY NETWORK (WLN)

The Washington Library Network's new on-line system is scheduled to be operational with serials records in the Summer of 1976. Initially, serials records are expected to come from two sources: the University of Washington, and MARC and CONSER records distributed by LC. The existing UW serials data base has brief records; during the conversion and loading of these records into the WLN data base, UW staff are expanding the records somewhat to include more data elements. In the Fall of 1976, ten other Washington libraries (mostly public) are expected to begin adding their serials holdings. Authority control for names and subjects is a feature of the WLN system, and will be applied to serials as well as monographic records.

The WLN file structure and data character set is full MARC. The Rather filing rules are programmed to cause entries to appear in approximately the same locations as provided by the LC filing rules for dictionary catalogs. Records entered in the WLN data base will be highly authoritative and in conformance with LC standards. Separate working files, as accessible to users as the main data base, will be established for records that have not been validated for inclusion in the main data base.

Although WLN has not yet produced a serials list, it has published a printed union catalog of monographic holdings for several Washington libraries over the past few years. COM capabilities are available at the state Data Processing Service Center. For further information, contact Mary Jane Pobst Reed, Associate State Librarian for Research and Planning (Automation), Washington State Library.

SPOKANE AREA COMBINED LIST - EAST WASHINGTON STATE COLLEGE (EWSC)

Charles H. Baumann, College Librarian, and Joan Tracy, Assistant Librarian for Technical Services, have developed a sophisticated system to produce a union list for all types of libraries in the Spokane area and the Tacoma Public. Main entries are relatively complete except for publisher and place of publication. There is some categorization by 30 general subject areas, but subject headings are not included. LCCNs and ISSNs are included, and all variant titles are cross-referenced. Data have been verified against NUC and NST, and are considered to be authoritative and of high quality. Entries are filed in accordance with LC rules by means of a manually-assigned numeric code. The file strucutre is non-MARC, and only uppercase characters are used.

To date, the list has been produced and distributed by the Spokane Public Library in printed form. While a microfiche form has not been tried yet, EWSC feels that a local service bureau would be able to do that work. Baumann has expressed interest in assisting other libraries in using the Spokane area list and the EWSC system to develop their own union lists.

MINNESOTA UNION LIST OF SERIALS (MULS)

As a base for the CONSER project, developed under the direction of Alice E. Wilcox, Director of MINITEX and Lois N. Upham, Data Base Manager, MULS is perhaps the best-known serials data base. Its coverage is extensive, both in terms of the number of serials titles included and in the number and types of libraries whose holdings are represented. Records are structured in a MARC(S) form with minor variance, and entries are more complete than in the other data bases surveyed. Both LCCNs and ISSNs are included, and variant titles are cross-referenced. Data have been verified against NUC, NST, LC Depository Catalog and other sources, and are considered to be highly authoritative. Entries are filed by computer algorithm, leading to occassional misfilings which are being corrected as found, and there are some variances from traditional filing rules (although these variances tend to lead to a more simplified filing structure). Holdings statements appear to be more extensive and readable than in other lists. A full MARC character set including diacritics is used.

North Dakota contracts with Minnesota to produce that state's union list: To date, this has been a satisfactory arrangement, and North Dakota holdings are being included in the next published edition of MULS (scheduled for April), which will be produced on microfiche. The MULS staff will create new records as needed from title pages for journals and submitted by participating libraries, thus maintaining a high degree of control over the quality of the data base.

SUMMARY

Major points on which the serials data bases can be compared are listed on the attached chart. The first line lists the number of serials titles (exclusive of cross-references) in each of the six data bases. The next rows list the number and types of libraries included in each data base. For CULP, no breakdown of special libraries by type is available. For MULS, the list of libraries and special collections (many of which are a part of the University of Minnesota) has been interpreted somewhat arbitrarily to develop the figures shown, which are only estimates.

The next row indicates whether or not titles are cross-referenced with their variants. No attempt has been made to estimate how inclusive these cross-references are in each data base. For some data bases, the computer is programmed to cause entries to be filed in the appropriate place on the union list; for the other data bases, proper filing positions are designated by assigning a number to an entry that will cause it to appear at the location desired. Computer filing rules are advantageous in that they do not allow inadvertent misfilings. However, they are much simpler than the LC filing rules for dictionary catalogs and are subject to implementations that overlook certain peculiarities appearing in text. For example, initialisms may be written in several ways, such as A.C.M, A. C. M., or ACM; unless a standard form is programmed for purposes of computer sorting, entries with variant forms may be scattered in the listing.

SUMMARY (cont.)

The richness of the record structure used in each data base and its "goodness of fit" to the MARC(S) format is suggested in the next row. In general, CULP, WLN and MULS come close to the MARC(S) standard, suggesting that a relatively costly conversion process would be necessary to merge the other data bases into a regional or national union serials file.

The next set of rows indicates what data elements are included in the serials records. Without an LCCN or ISSN, a title cannot be matched easily to serials records from CONSER or other sources. No national standard has been established for identifying libraries; the existing NUC codes are established mainly for large academic and public libraries, and do not include the smaller libraries. It might be desirable to establish identity codes for libraries that designated their state and locality as well as providing for branches and special collection locations. The "modified NUC" entries indicate that the state designator has been deleted; "local" codes usually are abbreviations for libraries' names.

The assessment of the authoritativeness of their data base was made by each survey respondent. All the data bases except for EWSC and DU are being maintained on IBM equipment, which may indicate that no computer-related constraints would hinder a possible merger or transfer of those data bases. Only the MULS and (when available) WLN data bases use the full MARC character set. CULP has both upper and lower case characters, but the remaining data bases are limited to upper case only. Only the ORULS and CULP data bases have been output on microfiche via a COM photocomposition device to date, although the next MULS edition will be produced by this technique. As with bookform catalogs, the cost of producing and distributing printed union lists is far higher than for microform versions.

The structure and content of holdings statements in the various data bases is suggested in the next row. "Brief" indicates that statements are short (possibly a bit on the cryptic side) and do not include call numbers. "Structured" indicates that the content of holdings statements is specifically defined; "highly structured" indicates that specific subfields are defined for portions of a holdings statement.

DATA BASE	DU	CULP	ORULS	WLN-UW	EWSC	MULS
SERIALS TITLES	?	70,000	45,000 by Jul 76	50,000 by August 76	7,231	77,785
LIBRARIES REPRESENTED IN DATA BASE:				MARC records, too		
Research	4	0	3	1	0	1
Academic	0	0	24	1	4	39
Junior College	0	75	13	?	3	14
Public	1	130	2	?	3	40
School	0	0	0	?	2	0
Law	0	?	2	?	2	5
Medical	1	?	1	?	7	48
Business	0	?	1	?	1	2
Scientific & Technical	0	?	1	?	3	14
Historical	0	?	1	?	1	1
Other Special Libraries	0	150	2	?	2	28
TITLES CROSS REFERENCED	no	partial	yes	yes, names too	yes	yes
FILING RULES	extensive	extensive	LC (all manual)	Rather;extensv.	LC (All manual)	Extensive
RECORD STRUCTURE	350 chars;title & holdings	MARC(S), incomplete	7 fields, 80 char records; up to 99/entry	MARC(S)	35 fields, variable length, + header	MARC(S), modified
DATA ELEMENTS						
Abbreviated Title	no	no	yes, but not as a cross-ref.	no	partial	yes
Former Title	no	yes	yes	no	yes	yes
Publisher	no	no	no	no	no	yes
Place of publication	no	partial	yes	no	no	yes
Classification	no	no	LC, Dewey, or SuDocs holding state	Dewey & NLM, partial	LC, SuDocs	In Holdings element
Subject Headings	no	no	no	no	no	no
LC Card Number	no	no	no	yes, partial	yes	yes
ISSN	no	yes	no	yes, partial	yes	yes
Language	no	no	no	no	non-roman only	yes
Active or Other Status Indicator	no	yes	partial	no	for EWSC only	no
Scope and/or Listing Note	no	yes	yes	no	yes	no
Holding Library Code	local	modified NUC & local	local	NUC	modified NUC	NUC + local
Holdings Statement	brief structured	brief structured	brief highly struct.	highly structured	structured	highly structured
AUTHORITATIVENESS	low	moderate	high	moderate (to be very high)	high	very high
COMPUTER	B6700	IBM 370/165	IBM 360/40	IBM 360/65	UNIVAC 70/7	IBM 360/148 VS
CHARACTER SET	Upper case	Upper & lower case	Upper case	Full MARC	Upper case	Full MARC
COM PRODUCTION	No	Yes, by Zytron & state contract	Service bureau in Portland w/ state contract	Provided by state	No, but could contract for	Trying it out in April, 76

7521205000045100:
4621207000045100:
2C:476:WICHE:2B121